AMERICAN
STATISTICAL ASSOCIATION.

NEW SERIES, No. 103. SEPTEMBER, 1913.

STREET TRAFFIC ACCIDENTS.*

By Frederick S. Crum.

The street accident problem as it is presented in various forms in our American cities looms so big that I can hope to touch upon only a few phases of it in the short time at my disposal. My remarks will be limited to that group of accidents which may perhaps be best described as traffic or vehicular accidents. Probably the majority of this class of accidents in cities occur in the streets. Many of the traffic accidents, however, particularly those classed as steam railway accidents, occur in railroad yards and on railway tracks within city limits. Some of the street car accidents, in cities like Boston, New York, Philadelphia, and Chicago occur in subways and some on elevated tracks. Vehicles for my purpose include everything on wheels or runners used to transport persons or goods on railway tracks within city limits or in city streets, excepting invalid chairs, baby carriages, and wheelbarrows. Usually also horses or other draft animals are considered a part of the vehicle to which they are attached, in discussions of vehicular accidents.† Kicks by horses and runaway accidents are generally included with street and traffic accidents. Obviously, however, some of the accidents by horse kicks occur in stables or elsewhere than on the streets.

What the actual conditions are in American cities as regards vehicular hazards it is difficult to determine from the information at present available. A fairly adequate notion, however, can be obtained from a careful study and analysis of the fragmentary data which may be derived from various sources.‡ To add to the difficulty, there seems to be a lack of uniformity

* Read at the quarterly meeting of the American Statistical Association, Yale Club, New York City, April 17, 1913.

† See Appendix K.

‡ See Appendices A, B, D, H, I, and J.

in reporting traffic accidents where they are reported at all by local or state authorities, and this must be expected so long as we almost everywhere find a division of responsibility and in many cases a duplication of reports through two or more separate offices. Here in New York City, for illustration, the coroners make certain returns, the Department of Health publishes other and different returns, the Public Service Commission compiles and publishes still different figures, and, finally, the National Highways Protective Society compiles statistics different from those found in any of the other three official tabulations.* Similar confusion exists in other cities and states and to such an extent that it is often quite difficult to reconcile one set of figures with another.

The Bureau of the Census in recent years has published some very interesting fatal traffic-accident statistics for the registration area, and although we know that these are not complete returns they are nevertheless useful as indicating the general trend of such accidents in an area which now embraces over 63 per cent. of the total population of the United States. According to the census reports there has been a slight decrease in fatal traffic accidents in the whole registration area during 1911 as compared with 1907, when measured against population. The rate was 271 per million of population in 1907 and 243 in 1911. The rates for steam railway accidents were 178 in 1907 and 143 in 1911; for street railway accidents the rates were 44 in 1907 and 35 in 1911. Automobile fatalities numbered 1,291 in the registration area in 1911 against only 294 in 1907, and the rates per million of population were 7 in 1907 and 24 in 1911. Fatal accidents due to wagons and horses and miscellaneous vehicles remained practically stationary during the five-year period, the rate being 42 in 1907 and 41 in 1911. In the registration cities there were 7,606 fatal traffic accidents, so classified, in 1911 as against 7,435 such accidents in 1907. Automobile accidents were the only class of fatal traffic accidents in the urban area which showed an increase during the five years, 1907–1912. The city fatality rate from automobiles was 9 per million of population in 1907 and 31 in 1911. The increase in the reported actual numbers was from

*See Appendix A, Tables I and V.

240 in 1907 to 985 in 1911.* Assuming that the same rapid increase in automobile fatalities has continued during 1912 and will continue during the present year, and assuming further that the automobile fatality rate returned by the Bureau of the Census for registration cities is practically the same as for all the urban area, I estimate that during 1913 there will be fully 2,000 automobile fatalities within the urban area of the United States. Many automobile fatalities, however, escape being reported as such in the census returns, and are reported under such ill-defined headings as fractures, traumatism, etc., so that it is very probable that the true number of automobile fatalities within the urban area of the United States during 1913 will exceed this estimate of 2,000. A similar estimate for the whole United States, based upon the rate for the whole registration area (1911) yields approximately 3,500 as the expected number of automobile fatalities during 1913.

Official reports for the whole United Kingdom showed 950 fatalities from motor car, motor omnibus, and motorcycle accidents during 1912.† The similar accurate official figure for the German Empire during 1912 was only 442.‡

To further illustrate the menace of the automobile in this country the following comparison for a few of the principal cities will be of interest:

FATALITIES FROM AUTOMOBILE ACCIDENTS.

City.	During		Increase	
	1907.	1912.	Actual.	Per Cent.
Baltimore	3	8	5	167
Buffalo	7	21	14	200
Chicago	27	104	77	285
New York City (Health Department Record)	42	188	146	348
Pittsburg	7 (1908)	28	21	300
Providence	2	11	9	450
St. Louis	4	21	17	425
San Francisco	13	22	9	70
Washington, D. C.	2	24	22	1100
Total for 9 cities	107	427	320	299

* See Appendix B for detail statistics of the registration area.

† See p. 12.

‡ See Appendix C, Table IV.

In these nine American cities there were only 15 fewer automobile fatalities recorded in 1912 than were returned for all Germany in the year ended September 30, 1912. The increase in this class of fatalities during an interval of five years was in actual numbers 320, or 299 per cent. The average increase in the automobile fatal accident rate in these nine cities on the basis of population was from a rate of 11.2 in 1907 to a rate of 40.3 per million population in 1912, or an actual rate increase of 29.1 per million of population. The rate in 1912 was 3.6 times that in 1907.*

From the census returns for 1909 for the registration cities it appears that about 30 per cent. of all the deaths from accidents, excluding injuries at birth, were traffic accidents. The aggregate number of reported traffic fatalities during 1909 in the registration cities was 6,605 and this number had increased to 7,606 by 1911. Of this total of traffic fatalities reported during 1911, 3,808, or 50.1 per cent. were steam railway accidents; 1,528, or 20.1 per cent. were street railway accidents 1,285, or 16.8 per cent. were accidents caused by wagons, horses and miscellaneous vehicles; and 985, or 13.0 per cent. were deaths caused by automobiles.†

Although during 1911 in our American urban area only 1 in every 8 of the traffic fatalities was caused by the automobile the ratio is increasing very rapidly. The motor car is fast replacing horse-drawn vehicles and as the relative numbers of the two classes of vehicles change we may expect a still larger increase in the automobile fatalities, and a further reduction in the fatalities from wagon accidents.

To still further emphasize the rapid increase in automobile fatalities in this country I may quote the following death loss statistics compiled from the mortality experience of 116 life insurance companies during the three years, 1910, 1911, and 1912:

* See Appendix D, Table I.
† See Appendix B, Table II.

MORTALITY FROM AUTOMOBILE ACCIDENTS, LIFE INSURANCE COMPANIES' EXPERIENCE.*

Year.	Deaths.	Amount of Claims.
1910	137	$449,638
1911	186	604,814
1912	232	1,041,819
Totals	555	$2,096,271

According to these statistics the deaths on account of automobile accidents in American life insurance companies' experience have nearly doubled in number in the last three years and the amount of claim losses has more than doubled.

Some idea of the increasing use of automobiles can be obtained from the following figures which are quoted from an address made in 1912 by Mr. Bertrand A. Page, vice-president of the Travelers Insurance Company: "Ten years ago, roughly estimated, there were less than 100,000 pleasure automobiles in the United States and Canada. To-day (1912) there are at least 900,000 in use. There were 180,000 automobiles sold in the United States in 1910, 190,000 in 1911 and it is estimated that approximately 210,000 new cars will be sold this year (1912)." Mr. Page also states that prior to 1907 the effect of automobile losses on the accident claim ratios of the Travelers Insurance Company was negligible, the losses paid for the five years, 1902 to 1906, inclusive, comprising only 2.9 per cent. of the total. Commencing with 1907, the ratio has steadily increased from 5.3 per cent. for that year to 21.8 per cent. in the year 1911, or in detail as follows:

CLAIM LOSS ON ACCOUNT OF AUTOMOBILE ACCIDENTS. TRAVELERS INSURANCE COMPANY.

Years.	Per Cent. of Total Claim Loss. All Causes.
1902–1906	2.9
1907	5.3
1908	6.5
1909	11.4
1910	14.1
1911	21.8

* Compiled by the Southern States Life Insurance Company, Atlanta, Ga., in 1913.

The automobile is so easily controlled that drivers are continually tempted to become careless and are apt to forget that their machines have weight as well as power and therefore develop great momentum even when going at a moderate rate of speed. The average-size automobile of to-day is heavier than were the cars on passenger trains in the early days of railroading, and the engines of modern high-power machines are more powerful than the first locomotives. Saturday last (April 12), Jules Goux, on an English track, drove a racing auto 106 miles and 387 yards in one hour, breaking all previous records. Only about two months ago an English driver established the first over-100-miles in an hour record, a feat which had been attempted for years without success, and yet last Saturday that first record of 103 miles in an hour was beaten by more than three miles. We are now speed mad and are getting more and more crazy. Think of driving machines as large, heavy and powerful as the up-to-date automobile over country roads at railway speed of 60, 70, 80 and more miles an hour, and yet that very thing is being done every day!

In 1830, when the Liverpool and Manchester railway was opened, eight trains of carriages with as many locomotives were sent over the road at a speed of fifteen miles an hour. A member of the House of Commons, Mr. Wm. Huskisson, one of the excursionists, was killed, and another prominent member of the party wrote to the editor of the Edinburgh Review saying among other things: "the folly of seven hundred people going fifteen miles an hour, in six carriages, exceeds belief." *

In 1854, in New Jersey, a work train, carrying a number of laborers, was backing down to a station when a cow suddenly jumped up from a hollow in which she was concealed, ran under the forward end of the first car, threw it off the track and down an embankment, six or eight feet high. Three other cars were dragged down the bank. The aggregate result was 12 persons killed, 10 seriously injured, and 12 slightly injured. †

These two illustrations will help us to appreciate the vast

* See "Notes on Railroad Accidents," by Charles Francis Adams, Jr., N. Y., 1879, p. 7.

† "Annual Reports of Railroad and Canal Companies of the State of New Jersey, 1854," p. 28.

progress that has been made in less than a hundred years in the speed and size of railway engines and trains, and they also emphasize the relative power, weight, and speed of the modern, trackless automobile as compared with the locomotives and railway cars in the early history of railroading.

The most accurate and complete statistics of automobile accidents are those for the German Empire. A census of automobiles was first taken in Germany on January 1, 1907, and a similar census has been taken annually as of January 1, from that date.

Detail statistics of automobile accidents have been compiled for Germany beginning with April 1, 1906. These returns are published in the quarterly reports of the Imperial Statistical Office and the year, for this statistical purpose, ends September 30. The statistics for six complete years are now available, or for the period 1907–1912, inclusive. The German census returns show an increase in the total number of automobiles and motorcycles from 41,727 on January 1, 1909 to 77,789, five years later, or on January 1, 1913. There has been an actual decrease in the motorcycles, or from 21,176 on January 1, 1909 to 20,448 on January 1, 1913, while the automobiles proper have increased in Germany from 20,551 in 1909 to 57,341 in 1913.* The census returns give many details, such as the horse-power of the automobile, the general purposes for which they are used, whether they are owned by German citizens, or by residents of other countries, whether they are freight or passenger machines, etc., and all these statistics are separately reported for the various larger political divisions of the Empire.

Nearly all of the accident statistics are also separately returned for the principal political divisions of the Empire. Among other facts disclosed in the accident returns are the number of persons injured, fatally and non-fatally; the amount of damage to other vehicles or goods, and to the machine causing the accident; the nature of the penalty, if any, imposed upon the person or persons to blame for the accident; and whether the blame attached to the driver, to a passenger in it, or to a person or persons outside it. The sex, age, and occupa-

* See Appendix C, Table I.

tion of the injured and killed are given in detail, also the place where the accident occurred—whether in cities of over 100,000 population (there being 38 such in Germany), in smaller cities, in villages, or on country roads. All of these classifications by age, sex, occupation, and place of accident are subdivided so as to indicate whether the injured or killed persons were drivers, other persons inside, or persons outside the automobiles. The non-fatal injuries are divided according to their nature and extent into 18 classes so that the number and character of the serious and slight non-fatal injuries can readily be determined. The day of the week and time of day of the accidents are reported and tabulated, also the horsepower of the machines involved. The general character of the accident is noted,—whether it was caused by collision with a street car, with another automobile, with a wagon or other vehicle, whether it was a case of hitting a pedestrian, etc. Also the cause of the accident so far as it can be determined is carefully noted and tabulated—whether it was due to excessive speed, to failure to sound a warning, to other inattention or carelessness of the chauffeur or driver, or the pedestrian; whether traceable to some defect in the street, to some defect in the machine, to explosion, to burning of the machine, etc. These and many other details are faithfully presented in these really wonderful German statistics.* Many very interesting and important facts are disclosed in these accident figures for Germany, a few of which I may here cite to illustrate the utility of such accurate and comprehensive returns. The number of persons non-fatally injured in automobile and motorcycle accidents in Germany has increased from 2,419 in 1907 to 5,542 in 1912, or 129.1 per cent. The number killed—and all those dying within a month subsequent to the accident are counted among the fatally injured—has increased from 145 in 1907 to 442 in 1912, or 204.8 per cent.

During the five years 1907–1911, 1,101 persons were killed in Germany, 802, or 73 per cent. being males, and 297, or 27 per cent. being females. The sex was reported of all but two of the 1,101 persons killed.† During the same five years 15,907 persons were non-fatally injured in motorcycle and

* See Appendix C.
† *Ibid*, Table IX.

automobile accidents in Germany and the sex was reported in all but 54 cases. Of the non-fatally injured, 72 per cent. were males and 28 per cent. females. Of the 1,101 persons killed in Germany during 1907–1911, the ages were reported in all but 3 cases, and 316 were under 16 and 163 were 61 years of age or over.* Of the total, therefore, 479, or 43.5 per cent. were either young or old persons.† Of the 15,907 persons non-fatally injured 3,001 were under 16 years of age, and 1,020 were 61 years of age or over, or about 26 per cent. of the total were young or old persons. Similar sex and age statistics are not available in the German returns for 1912.

Of the 1,101 persons killed during 1907 to 1911, 438 were killed in the large cities, 104 in the smaller cities, 161 in village streets and 389 on country roads.‡ In cities and villages together 703 persons, or 63.9 per cent. of the total, were killed as against the 398, or 36.1 per cent., on the country roads.

During the five years, 1907–1911, there were 85 drivers killed and 151 other persons in automobiles, while 865 of the 1,101 victims were outside the automobiles. These fatalities and non-fatal injuries were classified according to place of accident during 1907 to 1911 and although nearly 64 per cent. of all the fatal accidents during this period occurred in the cities and villages of Germany the percentages were entirely different for the drivers. Of that group only 15 of the total of 85 were killed in the cities and villages as against 70 on the country roads. Similar differences are to be noted for occupants of automobiles other than drivers, only 40 of whom were killed in cities and villages as against 111 killed on the country roads. These figures bring out clearly the fact that the automobile accident problem is very different in places where population is congested, as in cities, from that presented in places where the population is scattered, as in the country. In the first case the danger is principally to persons outside the automobiles, while on the country roads the hazard is about equally divided, according to the German experience—or 181 occupants were killed on the country roads as against 217

* See Appendix C., Table VIII.

† For similar data for New York City. See Appendix I.

‡ *Ibid*, Table XIV.

persons outside the machines.* This particular experience was not extended through 1912, or at least the corresponding statistics were not published in the last report.†

The German experience shows that about 17 per cent. of the freight-carrying automobiles meet with accidents, as against about 21 per cent. of the passenger type.‡ Over 27 per cent. of the passenger automobiles of from 16 to 40 horse-power meet with accidents in Germany every year. With freight-carrying machines of the same horse-power the percentage meeting with accidents has averaged over 17 during the six years, 1907 to 1912.

Enough has been said to indicate something of the detail of the German figures, the like of which is hardly imaginable for any state or city in this country. An automobile law comprehensive in character went into effect in Germany in 1910, and it was based upon full information of a statistical character that had then been accumulated for something over three years. Imagine, if you can, a state law in this country, or a city traffic ordinance based upon such full and illuminating statistics.§

The certainty of accountability, and the knowledge that punishment will be swift and sure for disregard of the law must act as a powerful deterrent and for the good of every user of the streets and roads of Germany. Otherwise, it would be difficult to explain why in all Germany during the six-year period, 1907–1912, there were only 1,543 persons killed by automobiles and motorcycles, while in the United States probably fully twice that number were killed in 1912, and in the Registration Area alone in 1911, 1,291 were killed by automobile accidents, according to the reports of the Census Office, which are admittedly incomplete in this particular.

Some excellent statistics of street railway accidents are available in the report presented by the German electric street railway companies to the International Hygiene Exhibit at Dresden in 1911. The accident problem had become so acute

* Appendix C, Table XIV.

† Vierteljahrshefte zur Statistik des Deutschen Reichs, Herausgegeben vom Kaiserlichen Statistischen Amte. Erstes Heft, 1913.

‡ Appendix C, Tables II and III.

§ The recently enacted Ordinance for New York City was based upon as good local information as was available. See Appendix H.

in Germany by 1909 that the street railway companies decided to coöperate in an extensive and thorough inquiry into the subject. As a result detail returns of accidents were secured from 158 companies, which together represented about 95 per cent. of the total mileage. The report as a whole is very interesting, but I can only mention a few of the more important facts which it disclosed.*

1. Statistics for the five years, 1905–1909, showed that 136 passengers had been killed on the electric railways making returns, only 7 of whom were under 13 years of age. The fatality rates based upon the number of passengers carried were fairly constant, fluctuating from 1.2 per 100,000,000 in 1909 to 2.1 in 1908.

2. The statistics of fatal injuries to persons other than passengers showed that children under 13 years of age formed the majority of the victims in every one of the five years for which the facts were collected. In the aggregate 732 persons other than passengers were killed, 409 of whom were persons under 13 years of age.† The report comments at some length upon the fact that parents are blameworthy for their negligence in permitting their young children to play in the streets. On the basis of car mileage the fatal accident rates of persons other than passengers remained fairly constant during the five years, and the same was true also of the severe and slight injury rates. According to the German figures, in about 95 per cent. of all the fatalities the fault lay with the victims, only about 5 per cent. being the result of carelessness on the part of the street railway employees.‡

The conclusions deduced from these German statistics may be briefly stated as follows:

First. The most potent and immediate remedy for present conditions will be found in the education of children and the public generally to exercise greater care when walking across streets, driving in other vehicles, or while boarding and alighting from cars.

* For some of the statistics compiled and re-arranged from this report see Appendix E. For a more full discussion of the report see a paper by the present writer published in The Spectator, New York, September 19 and October 31, 1912.

† See Appendix I, for statement of fatalities by age in New York City.

‡ See Appendix E, Table IV; also Appendix C, Table XII where it is shown that in automobile accidents a much larger proportion are due to causes beyond the control of the injured.

Second. The desirability of keeping children off streets used for electric street car traffic was particularly emphasized.

For the United Kingdom a statistical return is made to the House of Commons every year of all street accidents caused by vehicles and which were known to the police as having resulted in death or personal injury. This requirement was one of the good results of the investigation made by the Royal Commission on London Traffic, the work of which was concluded in 1905. These street accident returns for the United Kingdom date from May 1, 1908, and the first report was, therefore, for a period of only eight months. The statistics are classified as fatal and non-fatal and are further grouped according to the kind of vehicle, vehicles for this purpose being divided into six classes—horse-drawn omnibuses, other horse-drawn vehicles (excluding tramcars), horse-drawn tramcars, mechanically propelled tramcars, motor cars (including motor-cycles) and motor omnibuses. The tabulations are made in this detail by counties and by police districts.

A summary of these English statistics is presented in the following table for convenient reference:

STREET ACCIDENTS CAUSED BY VEHICLES IN THE UNITED KINGDOM, 1908–1912.

Kind of Vehicle.	Fatal Accidents.				
	1908.*	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	11	16	15	10	7
Other horse-drawn vehicles (excluding tramcars)	418	622	639	670	672
Horse-drawn tramcars	...	5	1	4	...
Mechanically propelled tramcars	69	122	112	123	135
Motor cars and cycles	198	311	478	633	751
Motor omnibuses	50	75	82	117	199
Total	746	1,151	1,327	1,557	1,764

STREET ACCIDENTS CAUSED BY VEHICLES IN THE UNITED KINGDOM, 1908–1912.

Kind of Vehicle.	Non-Fatal Accidents.				
	1908*.	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	283	383	262	208	145
Other horse-drawn vehicles (excluding tramcars)	8,627	13,241	13,289	13,165	13,130
Horse-drawn tramcars	101	111	71	54	19
Mechanically propelled tramcars	2,809	4,642	4,961	5,523	5,331
Motor cars and cycles	4,301	7,149	9,909	12,676	15,287
Motor omnibuses	1,106	1,346	1,258	2,027	2,921
Total	17,227	26,872	29,750	33,653	36,833

* Eight months only, and only for England and Wales.

These statistics are of interest as they indicate that whatever of increase there has been in fatal street-traffic accidents in the United Kingdom during the four years 1909–1912 has been due principally to motor cars and motor omnibuses, the fatalities from horse-drawn vehicles and from mechanically propelled tramcars having been practically the same for the three years. Combining the fatalities from motor cars, motorcycles, and motor omnibuses, we find that the numbers have increased in the United Kingdom from 386 in 1909 to 560 in 1910, to 750 in 1911, and to 950 in 1912. The actual increase in the fatalities resulting from motor cars and omnibuses in 1912 over the fatalities in 1909 was, therefore, 564, or 146.1 per cent.

The statistics of street traffic accidents in London* indicate that the conditions in that city have long been bad in this respect and vigorous efforts are being made to find some at least partial solution of the problem. Several traffic censuses have been taken to ascertain where congestion is greatest and the problem has now been studied by many experts and from various angles.† The conclusion thus far is that the remedies for present conditions must consist in the widening of streets so far as possible, in diverting traffic from congested to other less used streets, and in additional regulations governing the movement of traffic. It has also been suggested that at certain large open spaces where several converging lines of traffic meet, there should be underground subways for pedestrians to enable them to cross with safety. Two such subways already exist in London, but little use is made of them as the approaches and exits are by flights of stairs. It is suggested that in the new ones, when possible, the approaches and exits be made wider and on gentle declines and inclines. Still another suggestion has been made, namely, that in certain streets all the traffic be compelled to move in one direction. This has been criticized as bound to lead to greater speed of the vehicles, with correspondingly greater hazard to pedestrians who may be obliged to cross such thoroughfares.

During 1912 there were 353 motor car, motor omnibus and motorcycle fatalities in Greater London. All the other street

* See Appendix G for recent English statement of London conditions.

† See Report of the London Traffic Branch of the Board of Trade, 1912. London, 1913.

vehicles together killed 185 persons. The total number of persons killed by vehicles in London streets in 1912 was 538 as against 303 in 1909, an increase of 77.6 per cent. The motor vehicle fatalities increased from 145 in 1909 to 353 in 1912, or 143.4 per cent.*

Reference has already been made to the fatalities in the registration area of the United States from street railway accidents. In nine representative large cities of the United States the average fatality rate from street railway accidents has decreased from 73.5 per million population in 1907 to 44.5 in 1912. The statistics in detail for these cities are presented in Appendix D, Table II.

The fatalities from subway and elevated railway accidents in New York City, according to the Health Department record, have fluctuated somewhat from year to year during the period 1907–1912, but it can not be said that there has been any increase or decrease during that period. The average fatality rate from subway accidents per million population for the six-year period was 3.3, and the similar average fatality rate from elevated railroad accidents was 2.8. The details are presented in Appendix D, Table III.

The fatalities from steam railroad accidents in nine large representative cities of the United States have fluctuated considerably during the six-year period 1907–1912, or from 768 in 1907 to 543 in 1908. The average fatality rate for the nine cities combined was 86.1 in 1907, and 56.1 in 1912. There seems, therefore, to have been a diminution in this class of accidents in the larger urban centers during recent years. This can readily be accounted for by the gradual abolition of grade crossings and the more careful guarding of railroad properties in other respects. The details of the steam railroad fatalities in the nine representative cities are presented in Appendix D, Table IV.

Fatalities from wagons, bicycles, and other animal-propelled vehicles seem, on the whole, to have decreased somewhat in recent years in the larger urban centers of the United States. In the nine cities for which returns have been compiled the

*See Appendix F for London statistics and Appendix G for traffic conditions; see Appendix C, Table VII, for Berlin statistics of personal injuries, fatal and non-fatal, caused by automobiles and motorcycles, 1908–1912.

average fatality rate from this class of accidents was 59 per million population in 1907 and 37.9 in 1912. The rates have fluctuated and there is some reason to believe that the variations are of an accidental character rather than indicative of any considerable improvement in traffic hazards from this class of vehicles. In 1909, for illustration, the average fatality rate for the nine cities was only 36.6 per million population, while in 1911 the rate was 48.5, and in 1912 it had again declined to 37.9. The details of these statistics are presented in Appendix D, Table V.

Practically the only effective method thus far extensively adopted in this country to prevent traffic accidents in our city streets is through traffic regulation by municipal ordinance. Such ordinances are revised, amended, and extended from time to time, as new local conditions arise which seem to require correction. These rules and regulations governing street traffic are usually framed by the aldermanic or other similar local governing bodies and their enforcement is placed in the hands of the police.

I have recently read the traffic regulations in force in various of our larger cities, about forty in number, and while in many matters of detail they are all quite similar, there are some admirable ideas incorporated in a few of them that have not yet been generally adopted.*

When a street car is taking on or discharging passengers, a frequent cause of injury is another vehicle going in the same direction as the car and overtaking it while its passengers are alighting or getting on. To obviate or lessen this danger a very few cities require that the other vehicles come to a stop, other cities require that they keep to the right of such street cars, distances varying from four to twenty feet.

Another frequent cause of injury is found in the almost universal habit of boys and girls to hitch on to wagons, automobiles, and other vehicles. This is prohibited in some cities, also jumping upon or riding on the rear of such vehicles, without the driver's consent.

Roller-skating in streets has been absolutely prohibited in Washington, D. C., and all drivers will declare that such play

* See Appendix E, for excerpts from street traffic ordinances of several large American cities.

in the streets is one of the greatest nuisances with which they have to contend. Coasting in the public streets is usually prohibited, except by special permission and in designated localities, at specified times. Many of the worst of our street accidents have been caused by sledding in improperly protected streets.

A few of our cities have advanced far enough to prohibit bicyclists from carrying children on handle bars. Other rules of importance from the viewpoint of accident prevention relate to the distance which must intervene between vehicles following each other, the manner in which turns at corners must be made, etc. Of course nearly all traffic ordinances contain speed regulations, but of all the regulations these most important ones are most continually and consistently violated, and will continue to be until the violators are visited with penalties more in keeping with this particular offense.

The available statistics of street accidents furnish positive proof that traffic ordinances as at present enforced are not a complete solution of the street accident problem in this country.* All the cities for which we have even fragmentary street accident statistics show fatal accident rates much higher than those of London, Berlin,† or Paris. Perhaps one of the principal causes for this situation may be found in the fact that sufficient publicity is not given to street accident statistics in this country, and such accident statistics are not recorded and compiled in so complete and accurate a manner as is highly desirable in order that the conditions may be known in a more exact and convincing way than through the numerous, but non-cumulative, reports of accidents made in the columns of the daily press, or through the often conflicting reports of State, County, and Municipal authorities.

* "A lack of regard for traffic rules and regulations and ignorance of the Grant ordinance (1908), which clearly and succinctly outlines them, under five short, brief heads, is given as the cause of so many automobile accidents in Atlanta of late, which have caused the loss of life, injury to person and damage to property. According to police reports on them, in very nearly every instance the traffic ordinance has been violated, and the rights of the road not respected."

(From pamphlet issued by the City of Atlanta, Ga., in 1913, to emphasize the need of following traffic rules.)

† For Berlin Statistics, see Appendix C, Table VII.

Conclusions.

1. First of all we require more complete, accurate, and specific information relative to street traffic accidents. The recent German and English inquiries furnish clues as to what kind of data can be secured. At present the statistics available in official sources in this country are incomplete and inadequate for any purpose other than to indicate that street traffic accidents are unnecessarily numerous, both actually and in proportion to population.

The statistics of steam railway and street railway accidents compiled by the Public Service Commission of the First District here in New York State give some interesting details.* Distinction is made of injuries to employees, injuries to passengers, and injuries to persons other than employees and passengers. These statistics, too, for street railways are reported separately for the various surface street car lines or systems, elevated roads, and subway lines. It is interesting to note that in 1910 on the two subway lines then in operation 27 passengers were killed, 30 employees and no others. These facts illustrate the great advantage to the public of rapid transit facilities in that they tend greatly to reduce the accident liability of pedestrians and other users of the city streets.

The accident statistics compiled by the Public Service Commission are given in some detail as they relate to employees, but in my opinion they would be much more valuable if the accidents were reported separately for additional specific employments, or in the same manner and in the same detail that the employees are reported. It is of practical utility to know that the fatal accident liability of subway trackmen was 9.14 per 1,000 employed during 1909 and 1910 as against a rate of 1.79 for surface street railway trackmen. Similar facts if available in detail for all the important specific employments would be of exceptional value as indicating precisely where the danger points are in the transportation industry.

2. Traffic ordinances require in many cases to be more

* The statistics of fatal and non-fatal injuries to employees are apparently not complete. For illustration, the reported injuries to employees in the Hudson tubes include only injuries to employees on the New York side, although the reported number of persons employed include all the employees of the operating company.

specific, to cover more contingencies than at present, and to be more strictly enforced.

3. Relief of congested streets should be carried out as completely and expeditiously as is practicable. City planning commissions and traffic experts are working along these lines in various cities. As a part of this program every effort possible should be made to provide recreation centers and playgrounds for the children, so as to keep them off the streets as much as practicable during their play periods.

The growth of street car traffic during the last twenty years is a fair indication of the increasing use made of city streets for traffic pruposes. Unfortunately, our older cities were laid out when it was impossible to forecast their future development and the result is narrow streets, often in the very sections of the cities where traffic is heaviest. Four principal factors enter into street congestion—bulk of traffic, size of vehicle units, speed of vehicle units, and width of streets. Surface street cars run faster to-day than twenty years ago, also they are larger, but in almost any given city there are many more cars in use per mile of track to-day than formerly. And so as we analyze street car conditions we find that in most of the older cities the street car lines are overburdened with traffic—they are congested, and the congestion is largely due to narrow streets, too few street car lines, and faulty methods of line connection. In Newark, New Jersey, for illustration, in 1912 there were 78,000,000 rides taken on street cars as against 18,000,000 in 1893 and 45,000,000 in 1903. In 1893 the average number of rides per person was 90 as against 210 in 1912. In Newark there is the great advantage of one wide main thoroughfare, but aside from that, Newark is a typical, older city which long ago outgrew the street traffic facilities and practically nothing has yet been done materially to reduce the congestion of traffic—aside from improved police regulations and traffic ordinances. In twenty years the population of Newark has increased 85 per cent., the street car habit has increased 233 per cent., and the street areas have increased practically not at all.*

4. Education of parents, children, drivers, and the public

*These statistics for Newark are from "The Newarker," February, 1913. This particular number contained an excellent summary of traffic conditions in Newark. "The Newarker" is published monthly by the Free Public Library, Newark, N. J.

generally in the dangers incident to street travel and in the simple precautions which should be taken to avoid them so far as that is humanly possible.

In this connection it is interesting to note that the State of New Jersey has recently enacted a law which provides for the introduction into all the schools of the State of a system of instruction in the rudimentary principles of self-protection, which will familiarize the pupils with the causes that lead not only to accidental injury but also to the impairment of health, and of the best means by which these can be avoided. Thirty minutes every two weeks is the time allotted to this new and highly important line of constructive education, and at least once during each school term a lecture on the principles of accident prevention will be delivered by an accredited expert from the American Museum of Safety.

In adopting this plan of teaching children how accidents may be avoided, the State of New Jersey is simply following the example of Germany, where, to quote from an exhaustive report on the subject issued by the Bureau of Statistics a year ago, "this educational propaganda starts in the readers placed in the hands of school children, thus inoculating ideas of caution and safety at the very foundation of the child's life." An interesting article on the need of an educational campaign for the education of school children appeared in the Supplement to the Scientific American of April 12, 1913.*

Many of the more progressive public service corporations are making determined efforts to instruct their employees in the best known methods of accident prevention. In some cases the safety experts of these corporations not only instruct the employees of the corporations, but they also visit schools at stated intervals, or other public assemblies, and give illustrative talks on the dangers of street traffic and how best to avoid them. Here, as in so many other phases of the larger problem of conservation, education will probably be found to be the most potent influence for the removal of the ignorance, carelessness, and recklessness which at present are responsible for such a large percentage of the fatal and non-fatal injuries resulting from street traffic.

* The Dangers of Street Traffic and Danger Signals. An Educational Campaign. By Frederick Hutton, M. E., Sc. D.

Appendix A.

Street Traffic Accidents in New York City.

TABLE I.

A COMPARISON OF STATISTICS OF *AUTOMOBILE* AND *ELECTRIC STREET CAR* FATALITIES IN GREATER NEW YORK. RETURNS OF HEALTH DEPARTMENT COMPARED WITH COMPILATIONS MADE BY THE NATIONAL HIGHWAYS PROTECTIVE SOCIETY, 1910–1912.

Year.	Health Department.		National Highways Protective Society.*	
	Automobiles.	Electric Street Cars.	Automobiles.	Electric Street Cars.
1910	111	156	112	148
1911	128	122	142	109
1912	188	111	221	134
Total	427	389	475	391

* As a partial explanation of these discrepancies, the statistician of the National Highways Protective Society states that in the fatalities due to trolleys, compiled by the Society, trespassers or others killed because of gross negligence, are not included. He further states that garage accidents and fatalities due to gross carelessness, in which the victim was in the car, are not included as automobile accidents. Just why persons killed under these circumstances should not be classified as deaths due to trolley accidents, or automobile accidents, as the case may be, it is difficult to understand. While these deaths might preferably be reported separately, they certainly ought to be included in the general totals.

TABLE II.

FATALITIES IN GREATER NEW YORK CAUSED BY AUTOMOBILES, STREET CARS, AND HORSE-DRAWN VEHICLES, 1910–1912.* (RATES PER 1,000,000 POPULATION.)

Years Ending December 31.	Population.	Automobiles.†		Electric Street Cars.		Horse-drawn Vehicles.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1910	4,766,883	112	23.5	148	29.0	211	43.9	471	98.8
1911	4,899,851	142	31.1	109	22.3	172	26.6	423	86.3
1912	5,032,819	221	44.3	134	35.1	177	35.2	532	105.7
1910–1912	14,699,553	475	32.3	391	26.6	560	38.1	1,426	97.0

* Compiled by the National Highways Protective Society, see New York Times of February 2, 1913.
† Includes motorcycle fatalities.

TABLE III.

FATALITIES FROM RAILWAY ACCIDENTS, NEW YORK CITY, 1908–1912.*

Kind of Traffic.	1908.	1909.	1910.	1911.	1912.	Total.
Surface Street Cars	248	161	174	143	149	875
Subway and Elevated Cars	89	61	80	70	50	350
Steam Railways	107	107	123	101	78	516
Total	444	329	377	314†	286	1,750

* Statistics compiled by the Public Service Commission, First District.

† To illustrate the apparent lack of knowledge of the ultimate utility of accident statistics, it requires to be stated that this total of 314 includes 13 deaths from natural causes and 16 suicides. Why these deaths should have been included is probably known only to the compiler. How far the other statistics are similarly vitiated, it is impossible for me to state.

TABLE IV.

FATALITIES IN SUBWAY AND TUBES, NEW YORK CITY, 1907–1912.*

Year.	Employees.	Passengers.	Other Persons.	Total.
1907	23	13	3	39
1908	24	24	5	53
1909	16	22	2	40
1910	30	27	..	57
1911	17	25	..	42
1912	10	19	4	33
Total	120	130	14	264

* Statistics compiled by the Public Service Commission, First District.

TABLE V.

CORONER'S RETURNS OF FATALITIES CAUSED BY VEHICLES IN NEW YORK CITY.

1907–1912

Borough of Manhattan.

Kind of Traffic.	1907.	1908.	1909.	1910.	1911.	1912.	Total 1907–1912.
Automobiles	37	36	46*	63†	92‡	146	420
St. R. R. Surface	137	131	68	62	78	72	558
St. R. R. Elevated	19	11	8	17	10	6	71
St. R. R. Subway	14	17	13	24	19	14	101
Railway	21	22	20	14	15	9	101
Wagons and Others	124	94	85	102	144	111	660
Total	362	311	240	282	358	358	1911

* Three fatalities caused by motorcycles; † 1 fatality caused by motorcycle; ‡ 2 fatalities caused by motorcycle.

Borough of the Bronx.

Automobiles	6	7	6	14	12	19	64
St. R. R. Surface	22	9	6	14	16	18	85
St. R. R. Elevated	6	4	1	4	6	2	23
St. R. R. Subway	2	3	5	2	2	2	16
Railway	80	23	29	24	25	26	207
Wagons and Others	11	8	14	10	17	12	72
Total	127	54	61	68	78	79	467

Borough of Richmond.

Automobile	—	1	—	3	3	3*	10
St. R. R.	11	2	2	4	1	3	23
Railway	13	10	6	9	3	8	49
Wagons and Others	4	2	5	5	2	2	20
Total	28	15	13	21	9	16	102

* One fatality was caused by motorcycle.

Borough of Queens.*

				1910–1912.
Automobile	7	6	18	31
St. R. R.	8	8	11	27
Railway	48	40	25	113
Wagons and Others	5	3	8	16
Total	68	57	62	187

* Compiled returns for Queens borough are not available for 1907–1909 nor are such returns available for Brooklyn borough for 1907–1912.

APPENDIX B.

TABLE I.

FATALITIES FROM TRAFFIC ACCIDENTS, REGISTRATION AREA, U. S., 1907–1911. (RATES PER 1,000,000 POPULATION.)

Year Ending December 31.	Population.	Automobiles.		Street Cars.		Steam R. R.		Wagons, Horses, and Others.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1907...	45,500,625	294	6.5	1,880	41.3	7,676	168.7	1,810	39.8	11,660	256.3
1908...	47,605,626	393	8.3	1,696	35.6	6,080	127.7	1,924	40.4	10,093	212.0
1909...	49,710,627	632	12.7	1,723	34.7	6,659	134.0	2,152	43.3	11,166	224.6
1910...	51,815,630	980	18.9	1,949	37.6	7,577	152.0	1,940	37.4	12,746	246.0
1911...	53,920,631	1,291	23.9	1,883	34.9	7,696	142.7	2,237	41.5	13,107	243.1
Total	248,553,139	3,590	14.4	9,131	36.7	35,988	144.8	10,063	40.5	58,772	236.5

TABLE II.

FATALITIES FROM TRAFFIC ACCIDENTS IN REGISTRATION CITIES, U. S., 1907–1911. (RATES PER 1,000,000 POPULATION.)

Year Ending December 31.	Population.	Automobiles.		Street Cars.		Steam R. R.		Wagons, Horses, and Other.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1907...	27,771,540	240	8.6	1,647	59.3	4,404	158.6	1,144	41.2	7,435	267.7
1908...	28,670,744	322	11.2	1,425	49.7	3,269	114.0	1,079	37.6	6,095	212.6
1909...	29,569,948	500	16.9	1,401	47.4	3,489	118.0	1,215	41.1	6,605	223.4
1910...	30,469,152	721	23.7	1,562	51.3	4,173	137.0	1,122	36.8	7,578	248.7
1911...	31,368,356	985	31.4	1,528	48.7	3,808	121.4	1,285	41.0	7,606	242.5
Total	147,849,740	2,768	18.7	7,563	51.2	19,143	129.5	5,845	39.5	35,319	238.9

Appendix C.

Automobile and Automobile Accident Statistics of Germany.

TABLE I.

CENSUS RETURNS OF AUTOMOBILES AND MOTORCYCLES IN GERMANY.

Year Beginning January 1.	1907 to 1913.					
	Automobiles.			Motorcycles.		
	Passenger.	Freight.	Total.	Passenger.	Freight.	Total.
1907	10,115	957	11,072	15,700	254	15,954
1908	14,671	1,543	16,214	19,573	235	19,808
1909	18,547	2,004	20,551	20,928	248	21,176
1910	24,639	2,823	27,462	22,283	196	22,479
1911	31,696	4,082	35,778	20,535	121	20,656
1912	39,943	5,392	45,335	19,958	157	20,115
1913	49,760	7,581	57,341	20,325	123	20,448

TABLE II.

PERCENTAGE OF PASSENGER AUTOMOBILES AND MOTORCYCLES MEETING WITH ACCIDENTS IN GERMANY, CLASSIFIED BY HORSE-POWER. 1907–1912.

Year Ending September 30.	All Automobiles and Cycles.	Motorcycles.	Automobiles of			
			Up to 8 H. P.	Over 8 and up to 16 H. P.	Over 16 and up to 40 H. P.	Over 40 H. P.
1907	13.8	1.5	12.9	42.9	46.9	70.8
1908	12.4	1.2	12.2	36.9	34.7	49.4
1909	12.6	1.1	10.7	31.1	38.9	42.9
1910	12.4	1.0	10.2	27.6	24.2	13.5
1911	13.2	1.1	9.9	21.5	25.3	16.2
1912	13.5	1.0	9.5	16.5	26.2	18.0

PERCENTAGE OF FREIGHT-CARRYING AUTOMOBILES AND MOTORCYCLES MEETING WITH ACCIDENTS IN GERMANY, CLASSIFIED BY HORSE-POWER. 1907–1912.

Year Ending September 30.	All Automobiles and Cycles.	Motorcycles.	Automobiles of			
			Up to 8 H. P.	Over 8 and up to 16 H. P.	Over 16 and up to 40 H. P.	Over 40 H. P.
1907	17.5	31.1	12.1	20.3	18.0	12.5
1908	16.3	25.0	12.6	25.9	10.0	....
1909	14.7	35.2	9.5	20.8	14.4	6.9
1910	15.0	18.2	11.2	18.7	16.4	16.3
1911	17.9	2.5	14.6	18.7	20.8	15.8
1912	17.7	3.3	13.6	17.1	19.4	25.4

TABLE III.

PERCENTAGE OF ALL AUTOMOBILES AND MOTORCYCLES IN USE IN GERMANY WHICH WERE INVOLVED IN ACCIDENTS, 1907–1912, WITH DISTINCTION OF PASSENGER AND FREIGHT-CARRYING MACHINES AND HORSE-POWER. SIX YEAR SUMMARY.

Kind and Horse-Power.	Passenger Machines.			Freight-carrying Machines.		
	Total Number in Use.*	Number Involved in Accidents.	Per Cent. in Accidents.	Total Number in Use.*	Number Involved in Accidents.	Per Cent. in Accidents.
Motorcycles	123,693	1,443	1.2	1,080	234	21.6
All automobiles	183,673	37,897	20.6	24,844	3,872	15.6
Automobiles with:						
Less than 8 H. P.	72,053	7,632	10.6	8,481	1,044	12.3
8–16 H. P.	56,130	14,095	25.1	6,779	1,118	16.5
16–40 H. P.	52,137	14,221	27.3	8,456	1,475	17.4
40 and over H. P.	3,353	606	18.1	1,128	209	18.5
H. P. not known	.....	1,343	....	.....	26	....

* According to annual census returns. The aggregate number here represents the number of machines exposed to the risk of accident approximately one year.

TABLE IV.

NUMBER OF PERSONS KILLED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1912. CLASSIFIED AS DRIVERS, OTHER OCCUPANTS OF THE MACHINES, AND THIRD PERSONS.

Year Ending September 30.	Total Number Killed.	Drivers of Machines.		Other Occupants of Machines.		Persons Outside the Machines.	
		Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.
1907	145	13	9.0	17	11.7	115	79.3
1908	141	12	8.5	22	15.6	107	75.9
1909	194	13	6.7	31	16.0	150	77.3
1910	278	23	8.3	32	11.5	223	80.2
1911	343	24	7.0	49	14.3	270	78.7
1912	442	34	7.7	61	13.8	347	78.5
Total	1,543	119	7.7	212	13.7	1,212	78.6

TABLE V.

NUMBER OF PERSONS NON-FATALLY INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1912. CLASSIFIED AS DRIVERS, OTHER OCCUPANTS OF THE MACHINES, AND THIRD PERSONS.

Year Ending September 30.	Total Number Non-Fatally Injured	Drivers of Machines.		Other Occupants of Machines.		Persons Outside the Machines.	
		Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.
1907	2,419	199	8.2	367	15.2	1,853	76.6
1908	2,630	188	7.1	431	16.4	2,011	76.5
1909	2,945	225	7.7	487	16.5	2,233	75.8
1910	3,651	245	6.7	641	17.6	2,765	75.7
1911	4,262	311	7.3	702	16.5	3,249	76.2
1912	5,542	407	7.3	1,045	18.9	4,090	73.8
Total	21,449	1,575	7.3	3,673	17.1	16,201	75.5

TABLE VI.

NUMBER OF PERSONS FATALLY AND NON-FATALLY INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1909–1912. CLASSIFIED BY KIND OF MACHINE.

Year Ending September 30.	Fatalities Caused by				Non-Fatal Injuries Caused by			
	Automobiles.	Motorcycles.	Kind of Machine Not Stated.	Total.	Automobiles.	Motorcycles.	Kind of Machine Not Stated.	Total.
1909	183	10	1	194	2,671	235	39	2,945
1910	268	8	2	278	3,437	185	29	3,651
1911	331	10	2	343	4,058	171	33	4,262
1912	425	13	4	442	5,354	161	27	5,542
Total	1,207	41	9	1,257	15,520	752	128	16,400
Per cent. distribution	96.0	3.3	0.7	100.0	94.6	4.6	0.8	100.0

TABLE VII.

NUMBER OF PERSONS KILLED AND NON-FATALLY INJURED IN BERLIN, GERMANY, 1908–1912. (RATES PER 1,000,000 POPULATION.

Year Ending September 30.	Population.	Killed.		Non-Fatally Injured.	
		Number.	Rate.	Number.	Rate.
1908	2,058,813	29	14.1	839	407.5
1909	2,065,035	36	17.4	843	408.2
1910	2,071,257	70	33.8	1,257	606.9
1911	2,077,479	67	32.3	1,090	524.7
1912	2,083,701	75	36.0	1,343	644.5
Total	10,356,285	277	26.7	5,372	518.7

TABLE VIII.

AGE OF PERSONS KILLED AND INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.*

Year Ending September 30.	Number Killed.							Number Injured.						
	Age.							Age.						
	Under 16.	16–25.	26–40.	41–60.	61 and over.	Age not specified.	Total.	Under 16.	16–25.	26–40.	41–60.	61 and over.	Age not specified.	Total.
1907	35	25	36	31	16	2	145	422	462	770	497	161	107	2,419
1908	34	15	37	30	24	1	141	463	486	794	620	203	64	2,630
1909	60	22	39	51	22	....	194	570	595	903	628	193	56	2,945
1910	88	26	69	51	44	....	278	694	747	1,103	824	216	67	3,651
1911	99	25	72	90	57	....	343	859	894	1,262	936	247	64	4,262
Total	316	113	253	253	163	3	1,101	3,008	3,184	4,832	3,505	1,020	358	15,907
Percentage distribution.	28.7	10.3	23.0	23.0	14.8	0.2	100.0	18.9	20.0	30.4	22.0	6.4	2.3	100.0

* Similar returns by age not available for 1912.

TABLE IX.

SEX OF PERSONS KILLED AND INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.

Year Ending September 30.	Number Killed.				Number Injured.			
	Males.	Females.	Sex Not Specified.	Total.	Males.	Females.	Sex Not Specified.	Total.
1907	108	35	2	145	1,894	498	27	2,419
1908	110	31	..	141	2,055	570	5	2,630
1909	138	56	..	194	2,270	667	8	2,945
1910	200	78	..	278	2,835	809	7	3,651
1911	246	97	..	343	3,357	898	7	4,262
Total	802	297	2	1,101	12,411	3,442	54	15,907
Percentage distribution ..	72.8	27.0	0.2	100.0	78.0	21.6	0.3	100.0

* Similar returns by sex not available for 1912.

TABLE X.

AGE AND *SEX* OF PERSONS *KILLED* BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.

Year Ending September 30.	Under 16.			16–25.			26–40.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
1907.....	20	13	35*	24	1	25	32	4	36
1908.....	23	11	34	14	1	15	35	2	37
1909.....	45	15	60	11	11	22	37	2	39
1910.....	60	28	88	21	5	26	54	15	69
1911.....	56	43	99	20	5	25	65	7	72
Total.....	204	110	316	90	23	113	223	30	253
Per cent. of each sex at specified ages	64.6	34.8	100.0*	79.6	20.4	100.0	88.1	11.9	100.0
Per cent. of total at specified ages	25.5	37.2	28.8	11.2	7.8	10.3	27.9	10.1	23.0

Year Ending September 30.	41–60.			61 and over.			Summary—All Ages.			
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females	Unknown.	Total.
1907.....	18	13	31	13	3	16	108†	35	2	145†
1908.....	24	6	30	13	11	24	110	31‡	..	141‡
1909.....	37	14	51	8	14	22	138	56	..	194
1910.....	41	10	51	24	20	44	200	78	..	278
1911.....	64	26	90	41	16	57	246	97	..	343
Total...	184	69	253	99	64	163	802†	297‡	2	1,101
Per cent. of each sex at specified ages.	72.7	27.3	100.0	60.7	39.3	100.0	72.8	27.0	0.2	100.0
Per cent. of total at specified ages.....	23.0	23.3	23.0	12.4	21.6	14.8	100.0	100.0	.....	100.0

* In two cases sex not stated.
† In two cases age not stated.
‡ In one case age unknown.

TABLE XI.

NATURE AND *EXTENT* OF THE NON-FATAL PERSONAL INJURIES BY AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912.

Injury.	Year Ending September 30.						Total.	
	1907.	1908.	1909.	1910.	1911.	1912.	Number.	Per cent. Distribution.
Skull fracture	32	27	45	40	60	94	298	1.4
Brain concussion	83	98	113	147	182	230	853	4.0
Other head and face	61	56	98	94	67	73	449	2.1
Loss of eye	....	1	....	1	1	2	5	0.0
Sight impairment	....	....	....	1	....	4	5	0.0
Loss of ear, cheek	3	1	2	....	4	4	14	0.1
Loss of hearing	....	....	....	2	5	1	8	0.0
Loss of teeth, cut lip, etc.	402	435	441	661	758	1,166	3,863	18.0
Fracture of ribs, back, collar bone, shoulder, hip	76	109	108	132	169	186	780	3.6
Fracture of arm, or leg	166	162	171	235	263	399	1,396	6.5
Loss or crushing of legs or arms, hands, fingers, feet, etc.	....	2	3	4	16	17	42	0.2
Fracture of hands, fingers, feet, toes	44	51	48	52	61	84	340	1.6
Sprains	1,424	1,534	1,756	1,990	2,396	2,929	12,029	56.1
Burns	6	1	7	2	1	11	28	0.1
Serious internal	36	58	39	101	101	124	459	2.1
Slight internal	70	79	97	145	129	104	624	2.9
Shock	16	15	17	44	49	114	255	1.2
Poisoning	....	1	....	....	....	....	1	0.0
Total	2,419	2,630	2,945	3,651	4,262	5,542	21,449	100.0

TABLE XII.

CLASSIFICATION OF CAUSES OF AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912.

Accidents attributed to	Number.	Per cent. of Total.
Speeding, failure to signal	4,183	10.13
Careless driving	8,680	21.01
Not stopping to heed warnings	212	0.51
Failure of brakes or steering gear	555	1.34
Breakdown, puncture of tire, failure of ignition	363	0.88
Explosions, short circuits, hot axles	242	0.59
Wet, slippery, or icy pavements	2,011	4.87
Fault or carelessness of injured or third person	3,692	8.94
Fault of chauffeur and third person together	162	0.39
Cause unknown	21,206	51.34
Total	41,306	100.00

TABLE XIII.

CLASSIFICATION OF AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912, ACCORDING TO MANNER OF OCCURRENCE.

Accidents attributed to	Number.	Per cent. of Total
Collisions of automobiles with:		
Pedestrians, playing children, etc.	9,681	23.44
Wheel riders	5,624	13.61
Trolley cars	5,942	14.38
Other automobiles	2,230	5.40
Railroad trains	87	0.21
Equestrians, vehicles, etc.	9,007	21.81
Free-running animals	1,142	2.76
Other obstructions	1,632	3.95
Closed railroad gates	87	0.21
Lamp-posts and trees	1,520	3.68
Other forms of accidents:		
Plunging, upsetting, etc., of automobile	713	1.73
Falls out of automobile	131	0.32
Burning of automobile	248	0.60
Runaway of horses caused by automobiles	2,444	5.92
Other causes	818	1.98
Total	41,306	100.00

TABLE XIV.

LOCATION OF STREETS OR ROADS WHERE FATAL PERSONAL INJURIES FROM AUTOMOBILE AND MOTORCYCLE ACCIDENTS OCCURRED IN GERMANY, 1907–1911.*

Classification of Persons Killed.	Total Number Killed.	Persons Killed on							
		Streets of Large Cities.		Streets of Small Cities.		Village Streets.		Country Roads.	
		Number.	Per cent. Total.	Number.	Per cent. Total.	Number.	Per cent. Total.	Number.	Per cent. Total.
Drivers	85	3	0.7	3	2.9	9	5.6	70	17.6
Other occupants	151	15	3.4	6	5.8	19	11.8	111	27.9
Third persons	865	420	95.9	95	91.3	133	82.6	217	54.5
Total	1,101	438	100.0	104	100.0	161	100.0	398	100.0
Percentage distribution by locality	100.0		39.8		9.5		14.6		36.1

* Similar data for non-fatal injuries are available in the German reports. The statistics for 1912 do not include these data.

Appendix D.

Traffic Fatalities in Nine American Cities, 1907–1912.

TABLE I.

AUTOMOBILE FATALITIES IN NINE AMERICAN CITIES.
NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	3	3	8	6	6	8	34
Buffalo	7	5	5	20	14	21	72
Chicago	27	23	23	52	62	104	291
New York City	42	84	90	111	128	188	643
Pittsburg	*	7	7	12	15	28	69
Providence	2	7	5	9	13	11	47
St. Louis	4	3	6	3	13	21	50
San Francisco	13	15	8	9	17	22	84
Washington	2	...	5	8	10	24	49
Total	100	147	157	230	278	427	1,339

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	5.5	5.5	14.5	10.7	10.7	14.1	10.2
Buffalo	17.7	12.4	12.1	47.2	32.3	47.5	28.6
Chicago	13.2	11.0	10.8	23.8	27.8	45.6	22.4
New York City	9.6	18.7	19.4	23.3	26.1	37.4	22.8
Pittsburg	*	13.5	13.3	22.5	27.7	50.9	26.0
Providence	9.6	32.7	22.8	40.1	56.7	46.9	35.3
St. Louis	6.1	4.5	8.9	4.4	18.6	29.6	12.2
San Francisco	32.9	37.3	19.5	21.6	40.1	51.0	33.9
Washington	6.3	....	15.4	24.2	29.7	70.3	24.9
Average	11.2	15.2	15.9	22.7	26.8	40.3	22.5

* Statistics not available.

TABLE II.

STREET RAILWAY FATALITIES IN NINE AMERICAN CITIES.
NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	18	16	17	26	18	19	114
Buffalo	16	13	12	30	20	22	113
Chicago	197	125	131	119	95	195	862
New York City*	280	248	182	156	122	111	1,099*
Pittsburg	†	37	32	35	34	26	164
Providence	18	13	16	8	12	8	75
St. Louis	54	48	39	53	57	45	296
San Francisco	57	89	59	70	36	26	337
Washington	16	20	16	15	17	19	103
Total	656	609	504	512	411	471	3,163

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	33.1	29.2	30.7	46.5	31.9	33.4	34.2
Buffalo	40.5	32.1	29.0	70.8	46.2	49.7	44.9
Chicago	96.6	59.9	61.3	54.5	42.5	85.4	66.5
New York City*	64.1	55.1	39.3	32.7	24.9	22.1	39.0*
Pittsburg	†	71.5	60.9	65.5	62.7	47.2	61.4
Providence	86.2	60.7	73.0	35.7	52.3	34.1	56.4
St. Louis	82.6	72.2	57.7	77.1	81.6	63.4	72.4
San Francisco	144.4	221.3	144.1	167.9	84.8	60.2	135.9
Washington	50.7	62.4	49.1	45.3	50.5	55.6	52.3
Average	73.5	63.0	50.9	50.5	39.7	44.5	53.1

* Exclusive of Elevated Railroad and Subway fatalities.
† Statistics not available.

TABLE III.

SUBWAY AND ELEVATED RAILWAY FATALITIES IN NEW YORK, 1907–1912. (HEALTH DEPARTMENT RECORD.)

Year.	Population.	Subway.		Elevated Railroad.	
		Number Killed.	Rate per Million Population.	Number Killed.	Rate per Million Population.
1907	4,367,978	10	2.3	15	3.4
1908	4,500,946	15	3.3	19	4.2
1909	4,633,914	17	3.7	4	0.1
1910	4,766,883	21	4.4	12	2.5
1911	4,899,851	15	3.1	16	3.3
1912	5,032,819	16	3.2	12	2.4
Total	28,202,391	94	3.3	78	2.8

TABLE IV.

STEAM RAILROAD FATALITIES. NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	44	31	33	44	29	26	207
Buffalo	95	69	57	63	67	72	423
Chicago	316	192	219	247	198	231	1,403
New York City	178	102	82	106	78	56	602
Pittsburg	*	96	74	128	91	100	489
Providence	12	10	15	12	11	20	80
St. Louis	80	74	54	55	77	59	399
San Francisco	24	26	7	11	16	15	99
Washington	19	17	11	10	5	15	77
Total	768	617	552	676	572	594	3,779

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	80.9	56.5	59.6	78.8	51.5	45.7	62.1
Buffalo	240.2	170.4	137.6	148.7	154.7	162.7	168.3
Chicago	155.0	92.0	102.5	113.0	88.6	101.2	108.2
New York City	40.3	22.7	17.7	22.2	15.9	11.1	21.4
Pittsburg	*	185.5	140.8	239.7	167.9	181.7	183.2
Providence	57.4	46.7	68.4	53.5	47.9	85.3	60.1
St. Louis	122.4	113.3	79.9	80.1	110.3	83.2	97.6
San Francisco	60.8	64.7	17.1	26.4	37.7	34.7	39.9
Washington	60.3	53.0	33.8	30.2	14.9	43.9	39.1
Average	86.1	63.9	55.8	66.7	55.2	56.1	63.5

* Statistics not available.

TABLE V.

FATALITIES FROM WAGONS AND OTHER VEHICLES.

NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	6	10	8	13	8	7	52
Buffalo	4	1	1	1	...	4	11
Chicago	92	49	65	70	73	113	462
New York City	371	206	213	265	362	210	1,627
Pittsburg	*	13	16	9	10	23	71
Providence	9	8	13	6	7	10	53
St. Louis	13	32	13	15	13	8	94
San Francisco	25	31	19	20	17	19	131
Washington	6	17	14	9	12	7	65
Total	526	367	362	408	502	401	2,566

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	11.0	18.2	14.5	23.3	14.2	12.3	15.6
Buffalo	10.1	2.5	2.4	2.4	....	9.0	4.4
Chicago	45.1	23.5	30.4	32.0	32.7	49.5	35.6
New York City	34.9	45.8	46.0	55.6	73.9	41.7	57.7
Pittsburg	*	25.1	30.4	16.9	18.5	41.8	26.6
Providence	43.1	37.4	59.3	26.8	30.5	42.6	39.8
St. Louis	19.9	48.1	19.2	21.8	18.6	11.3	22.9
San Francisco	63.3	77.1	46.4	48.0	40.1	44.0	52.9
Washington	19.0	53.0	43.0	27.2	35.7	20.5	33.0
Average	59.0	38.0	36.6	40.3	48.5	37.9	43.1

* Statistics not available.

TABLE VI.

SUMMARY OF THE STREET TRAFFIC FATALITIES IN NINE AMERICAN CITIES, 1907–1912.*

NUMBER KILLED.

Year.	Automobile.	Street Car.	Steam R. R.	Wagon and Others.	Total.
1907	100	556	768	526	2,050
1908	147	609	617	367	1,740
1909	157	504	552	362	1,575
1910	230	512	676	408	1,826
1911	278	411	572	502	1,763
1912	427	471	594	401	1,893
1907–12	1,339	3,163	3,779	2,566	10,847

FATALITY RATES PER 1,000,000 POPULATION.

Year.	Automobile.	Street Car.	Steam R. R.	Wagon and Others.	Total.
1907	11.2	73.5	86.1	59.0	229.9
1908	15.2	63.0	63.9	38.0	180.0
1909	15.9	50.9	55.8	36.6	159.2
1910	22.7	50.5	66.7	40.3	180.3
1911	26.8	39.7	55.2	48.5	170.2
1912	40.3	44.5	56.1	37.9	178.7
1907–12	22.5	53.1	63.5	43.1	182.1

* Exclusive of fatalities in subways and on elevated railroads in New York. For these see Appendix D, Table III.

TABLE VII.

POPULATIONS ON WHICH RATES ARE BASED.

Year.	Baltimore.	Buffalo.	Chicago.	New York.	Pittsburg.
1907	543,626	395,437	2,039,270	4,367,978	.....
1908	548,579	404,863	2,087,941	4,500,946	517,425
1909	553,532	414,289	2,136,612	4,633,914	525,665
1910	558,485	423,715	2,185,283	4,766,883	533,905
1911	563,437	433,140	2,233,953	4,899,851	542,145
1912	568,389	442,565	2,282,623	5,032,819	550,385
Total	3,336,048	2,514,009	12,965,682	28,202,391	2,669,525

Year.	Providence.	St. Louis.	San Francisco.	Washington.	Total for Nine Cities.
1907	208,911	653,491	394,673	315,363	9,661,157
1908	214,049	664,670	402,086	320,598	8,996,487
1909	219,187	675,849	409,499	325,833	9,894,380
1910	224,326	687,029	416,912	331,069	10,127,607
1911	229,464	698,208	424,325	336,304	10,360,827
1912	234,602	709,387	431,738	341,539	10,594,047
Total	1,330,539	4,088,634	2,479,233	1,970,706	59,556,767

Appendix E.

STATISTICS OF ELECTRIC STREET RAILWAY ACCIDENTS IN GERMANY.

TABLE I.

PASSENGERS (FAHRGAESTE)* INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

Years.	Number of Companies Reporting.	Number of Passengers Carried.	Number of Passengers Injured.							
			Slightly.		Severely.		Fatally.†		Total.	
			Children.‡	Adults.‡	Children.	Adults.	Children.	Adults.	Children	Adults.
1905....	123	1,430,298,593	82	2,450	10	266	2	16	94	2,732
1906....	130	1,580,733,246	77	2,631	7	335	2	24	86	2,990
1907....	140	1,750,266,590	61	2,661	2	354	1	29	64	3,044
1908....	150	1,846,750,324	72	2,615	8	371	2	36	82	3,022
1909....	158	1,949,621,269	76	2,513	11	372	..	24	87	2,909
1905–09.	...	8,557,670,022	368	12,870	38	1,698	7	129	413	14,697

INJURY RATES OF PASSENGERS PER 100,000,000 CARRIED—CHILDREN AND ADULTS.

Years.	Slightly Injured.		Severely Injured.		Fatally Injured.		Total Injured Non-Fatally and Fatally.	
	Number.	Rate.	Number.	Rate.	Number.	Rate.	Number.	Rate.
1905.....	2,532	177.0	276	19.3	18	1.3	2,826	197.6
1906.....	2,708	171.3	342	21.6	26	1.6	3,076	194.5
1907.....	2,722	155.5	356	20.3	30	1.7	3,108	177.5
1908.....	2,687	145.5	379	20.5	38	2.1	3,104	168.1
1909.....	2,589	132.8	383	19.6	24	1.2	2,996	153.6
1905–09.....	13,238	154.7	1,736	20.3	136	1.6	15,110	176.6

* By Fahrgaeste is meant all persons on cars, and persons about to board or actually boarding cars, also all persons alighting from cars.

† By fatal injuries are meant injuries which result in death within 24 hours after the accident. By severe or serious injuries are meant fractures, internal injuries, etc., which require that the victim be confined to his bed three weeks or longer.

‡ Children include persons under 13 years of age; adults include all persons 13 years of age or over.

TABLE II.

PERSONS ("PASSANTEN") OTHER THAN PASSENGERS INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

Years.	Number of Car Miles.	Number of Persons Injured—Not Passengers.							
		Slightly.		Severely.		Fatally.		Total.	
		Children.	Adults.	Children.	Adults.	Children.	Adults.	Children.	Adults.
1905	255,001,065	466	1,231	85	241	59	51	610	1,523
1906	275,403,562	546	1,421	77	271	76	58	699	1,750
1907	304,816,441	548	1,606	99	301	101	59	748	1,966
1908	324,389,796	622	1,438	118	337	89	82	829	1,857
1909	338,654,953	658	1,556	81	329	84	73	823	1,958
1905–09 .	1,498,265,817	2,840	7,252	460	1,479	409	323	3,709	9,054

INJURY RATES ON THE BASIS OF EVERY 10,000,000 CAR MILES.

Years.	Slightly Injured.		Severely Injured.		Fatally Injured.		Total Injured Non-Fatally and Fatally.	
	Children.	Adults.	Children.	Adults.	Children.	Adults.	Children.	Adults.
1905.....	18.3	48.3	3.3	9.5	2.3	2.0	23.9	59.8
1906.....	19.8	51.6	2.8	9.8	2.8	2.1	25.4	63.5
1907.....	18.0	52.7	3.2	9.9	3.3	1.9	24.5	64.5
1908.....	19.2	44.3	3.6	10.4	2.7	2.5	25.5	57.2
1909.....	19.4	45.9	2.4	9.7	2.5	2.2	24.3	57.8
1905–09.....	19.0	48.4	3.1	9.9	2.7	2.2	24.8	60.4

TABLE III.

AGES OF PERSONS INJURED IN ELECTRIC STREET CAR ACCIDENTS, GERMANY, 1905–1909.

ACTUAL NUMBERS.

PASSENGERS INJURED WHILE BOARDING OR ALIGHTING FROM ELECTRIC STREET CARS.				
Males.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
13–25.....	546	103	14	663
26–40.....	1,235	186	25	1,446
41–60.....	573	114	15	702
61 and over.	93	15	..	108
Total. ..	2,447	418	54	2,919
Females.				
13–25.....	427	58	7	492
26–40.....	599	99	11	709
41–60.....	297	70	12	379
61 and over	69	31	8	108
Total....	1,392	258	38	1,688

PERSONS OTHER THAN PASSENGERS INJURED BY ELECTRIC STREET CARS.				
Children.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
Under 5 ...	632	133	198	963
5–7.....	532	112	86	730
8–12.....	407	79	37	523
Total....	1,571	324	321	2,216
Adults—Males and Females.				
13–25.....	466	99	28	593
26–40.....	664	175	40	879
41–60.....	474	145	59	678
61 and over	167	71	45	283
Total....	1,771	490	172	2,433

PERCENTAGE DISTRIBUTION.

PASSENGERS INJURED WHILE BOARDING OR ALIGHTING FROM ELECTRIC CARS.				
Males.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
13–25.....	22.3	24.6	25.9	22.7
26–40.....	50.5	44.5	46.3	49.5
41–60.....	23.4	27.3	27.8	24.0
61 and over	3.8	3.6	....	3.8
Total....	100.0	100.0	100.0	100.0
Females.				
13–25.....	30.7	22.5	18.4	29.1
26–40.....	43.0	38.4	28.9	42.0
41–60.....	21.3	27.1	31.6	22.5
61 and over	5.0	12.0	21.1	6.4
Total....	100.0	100.0	100.0	100.0

PERSONS OTHER THAN PASSENGERS INJURED BY ELECTRIC STREET CARS.				
Children.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
Under 5 ...	40.2	41.0	61.7	43.5
5–7.....	33.9	34.6	26.8	32.9
8–12.....	25.9	24.4	11.5	23.6
Total....	100.0	100.0	100.0	100.0
Adults—Males and Females.				
13–25.....	26.3	20.2	16.3	24.4
26–40.....	37.5	35.7	23.3	36.1
41–60.....	26.8	29.6	34.3	27.9
61 and over	9.4	14.5	26.1	11.6
Total....	100.0	100.0	100.0	100.0

TABLE IV.

CAUSES OF INJURIES TO PASSENGERS IN ELECTRIC STREET-CAR ACCIDENTS, GERMANY, 1905–1909.

Causes.	Number of Passengers Injured.								
	Children.			Male Adults.			Female Adults.		
	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.
Carelessly boarding or alighting from cars in motion....	194	33	6	5,838	874	72	3,172	467	50
Carelessly leaning out of car windows.....	20	1	..	92	7	..	26	2	..

	Children.			All Adults.		
	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.
Causes beyond control of injured passengers:						
a—Street cars.....	102	1	1	3,312	301	6
b—Causes external to street cars.....	52	3	..	430	47	1

OTHER PERSONS, NOT PASSENGERS, INJURED BY ELECTRIC STREET CARS IN GERMANY, 1905–1909, ON ACCOUNT OF THEIR CARELESSLY GETTING ON TRACKS OR RUNNING OR DRIVING AGAINST STREET CARS.

	Slightly Injured.	Severely Injured.	Fatally Injured.
Children.....	2,736	452	406
Sober adults:			
Males.....	3,899	801	202
Females.....	1,030	250	51
Total.....	4,929	1,051	253
Intoxicated adults:			
Males.....	409	87	32
Females.....	13	2	3
Total.....	422	89	35
Total adults.....	5,351	1,140	288
Grand total, children and adults.....	8,087	1,592	694

CAUSES INDEPENDENT OF THE CONTROL OF THE INJURED—OTHER PERSONS.

	Slightly Injured.	Severely Injured.	Fatally Injured.
Street car causes:			
Children.....	64	4	1
Adults.....	1,809	310	31
Total.....	1,873	314	32
Causes attributable to third persons:			
Children.....	40	4	1
Adults.....	102	29	4
Total.....	142	33	5
Grand total.....	2,015	347	37

TABLE V.

SEASONAL OCCURRENCE OF PERSONAL INJURIES BY ELECTRIC STREET CARS, GERMANY, 1905–1909.

PASSENGERS.

Months.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
March–May	3,359	25.6	446	27.0	32	25.4	3,837	25.8
June–August	3,504	26.7	438	26.5	31	24.6	3,973	26.7
September–November	3,548	27.1	445	26.9	41	32.5	4,034	27.1
December–February	2,697	20.6	325	19.6	22	17.5	3,044	20.4
Total	13,108	100.0	1,654	100.0	126	100.0	14,888	100.0

PERSONS OTHER THAN PASSENGERS.

March–May	2,520	25.8	443	23.0	174	24.0	3,137	25.3
June–August	2,903	29.7	591	30.6	231	31.8	3,725	30.0
September–November	2,445	25.1	521	27.0	197	27.2	3,163	25.5
December–February	1,893	19.4	375	19.4	123	17.0	2,391	19.2
Total	9,761	100.0	1,930	100.0	725	100.0	12,416	100.0

TABLE VI.

TIME OF DAY AT WHICH PERSONS WERE INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

PASSENGERS.

Time of Day.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Before 9 A. M.	1,135	10.2	136	9.7	18	15.6	1,289	10.2
9 to noon	1,723	15.5	153	10.9	17	14.8	1,893	14.9
Noon to 6 P. M.	3,939	35.3	506	36.0	34	29.6	4,479	35.4
6 P. M. and after	4,351	39.0	611	43.4	46	40.0	5,008	39.5
Total	11,148	100.0	1,406	100.0	115	100.0	12,669	100.0

PERSONS OTHER THAN PASSENGERS.

Before 9 A. M	865	10.5	164	9.5	32	4.9	1,061	10.0
9 to noon	1,558	19.0	308	17.7	105	16.0	1,971	18.6
Noon to 6 P. M.	3,407	41.5	700	40.3	309	47.1	4,416	41.7
6 P. M. and after	2,380	29.0	564	32.5	210	32.0	3,154	29.6
Total	8,210	100.0	1,736	100.0	656	100.0	10,602	100.0

TABLE VII.

NATURE AND EXTENT OF INJURIES BY ELECTRIC STREET CARS, GERMANY, 1905–1909.

Nature and Extent of Injuries.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Fracture of skull	.....	.....	272	7.9	303	36.2	575	2.2
Concussion of brain	304	1.4	497	14.3	95	11.3	896	3.4
Other injuries to head and face	1,439	6.6	274	7.9	29	3.5	1,742	6.6
Broken ribs, collar bone, shoulder blade, back	.....	.....	399	11.5	48	5.7	447	1.7
Broken arm, leg, thigh, shin	.....	.....	997	28.7	37	4.4	1,034	3.9
Loss of one or both arms or legs	.....	.....	165	4.8	96	11.5	261	1.0
Broken hand, fingers, toes	.....	.....	226	6.5	.....	.....	226	0.9
Bruises, sprains, muscle lacerations	7,924	36.1	426	12.3	54	6.4	8,404	32.0
Skin abrasions, cuts, broken teeth	11,224	51.1	.....	.....	.....	.....	11,224	42.8
Internal injuries	189	0.9	113	3.3	176	21.0	478	1.8
Nerve affections, collapse, etc.	860	3.9	98	2.8	.....	.....	958	3.7
Total	21,940	100.0	3,467	100.0	838	100.0	26,245	100.0

Appendix F.

STATISTICS OF TRAFFIC ACCIDENTS IN GREATER LONDON,* 1909–1912. (COMPILED FROM ANNUAL RETURNS OF DEATHS AND PERSONAL INJURIES KNOWN BY THE POLICE TO HAVE BEEN CAUSED BY VEHICLES IN STREETS, ROADS, OR PUBLIC PLACES.)

Kind of Vehicle.	Persons Fatally Injured.			
	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	9	8	1	5
Other horse-drawn vehicles (exclusive of tramcars)	120	139	120	143
Horse-drawn tramcars	3	1	1	.....
Mechanically propelled tramcars	26	24	26	37
Motor cars and cycles	86	129	155	171
Motor omnibuses	59	66	107	182
Total	303	367	410	538

Kind of Vehicle.	Persons Non-fatally Injured.			
	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	295	201	136	90
Other horse-drawn vehicles (exclusive of tramcars)	5,913	5,676	5,296	5,170
Horse-drawn tramcars	99	62	44	16
Mechanically propelled tramcars	2,092	2,231	2,330	2,231
Motor cars and cycles	3,402	4,489	5,501	6,316
Motor omnibuses	1,284	1,197	1,947	2,828
Total	13,085	13,856	15,254	16,651

*Metropolitan Police District and City of London.

Appendix G.

Discussion of Street Mortality in London. The Spectator, London, Eng., 1913.

"The select Committee of the House of Commons, under the presidency of Sir George Toulman, has been investigating the street accidents of the Metropolis, especially in connection with motors. It appears that the Chief Commissioner of Police has prepared a most elaborate analysis of actual returns of accidents for the period 1910–12. We gather thence that during that period the number of children killed was 136 per million of the population, as against 122 adults. That is a very striking fact. There was a higher rate of fatalities amongst persons between 15 and over 60 years of age, which might arise from the fact that they took more journeys into the busier danger zone than young children and old people, who were more or less confined to their own locality. It appears that a comparative return of street fatalities elsewhere than London showed that in relation to area there were fewer fatalities in the Metropolitan Police District than in Glasgow, Liverpool, Manchester, Berlin, Birmingham, Edinburgh, City of London, Brussels; and in relation to population fewer than in the City of London, Paris, New York, Chicago, the proportion in Chicago being nearly double. It further appears, as might be expected, that accidents were most numerous in areas of congested traffic. It is shown too that the total number of persons injured in 1901 was 9,197, and in 1911, 18,749. The difference of these totals is highly suggestive. Allowing for increased population and the increased number of journeys taken by everyone the accident rate of 9,197 in 1901 was equivalent to at least 17,410 in 1912. Cycle fatalities showed, as might be anticipated, a remarkable increase. During last year no less than 65 cyclists were actually killed. Unquestionably the ordinary cycle is not a safe vehicle for streets where motors run, as well as many other forms of mechanically propelled traffic. What is to be done it is very difficult to say. The facts and figures are here, and the commission has already told us very much that we knew before and of which not a little has

from time to time been already expressed in these columns. Of course, the main cause of the increasing risks of the streets to pedestrians as well as cyclists, arises from the *variety* of the traffic and the mixture of vehicles of so many kinds. Formerly we had virtually only fast and slow locomotion in the road, but now there are more than half a dozen descriptions of vehicles to consider, and then in streets and roads where trams run, the risk is enormously increased. The bare idea of taking up and setting down passengers in the middle of the road a generation ago would have been scouted as impossible. The railway train proper has a platform for alighting from and entering trains, but our light street railways have none of the safeguards so carefully thought out for the safety of railway passengers. Is it not strange that with so much public hygiene, so much vexatious sanitary legislation, and the like, that the safety of the tram passenger is practically left to the individual, and so, naturally, we have a heavy mortality thence, while the big trams blocking the perspective view of the road and street, considerably increase the risk for those who are not riding by tram."

Appendix H.

Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

The present city ordinance is antiquated, ineffective, inadequate, and unsatisfactory to the public in general and to those who have to do with the enforcement of the law. Some slight amendments have been made to the proposed ordinance heretofore reported, which in the main will make the proposed ordinance more acceptable to all concerned. The changes may be briefly summarized as follows:

The first proposed ordinance provided a strict 15 mile per hour limitation in the built-up portions of the city. This feature has been changed in accordance with the practice obtaining in practically all of the cities of the United States, making any speed in excess of 15 miles per hour *prima facie* evidence of reckless driving. The committee has seen fit, however, to add a strict limitation of 20 miles. The *prima*

facie rule makes possible an arrest at any time for exceeding 15 miles per hour, and there is a legal presumption of guilt on the part of defendant unless he can demonstrate to the satisfaction of the Court that there was no recklessness. The speed permitted on country roads and outlying sections of the city remains 25 miles per hour, the same as previously reported.

The committee has made no change in the severe penalties for reckless driving, which apply under all circumstances and conditions, regardless of the rate of speed whether it be 4 or 15 miles per hour. These penalties alone should discourage speeding, and taken together with the *prima facie* rule and the limitations prescribed should prove effective for all purposes.

Comparative Dangers of Vehicular Traffic.

Owing to the fact that there is now no accurate record of the number of automobiles and other classes of vehicular traffic it is impossible to make an accurate comparison. It was urged at the outset by the automobilists that the danger incidental to motor traffic was much less than that of other street traffic. The hospital records and the coroners' records submitted herewith for this year would seem to indicate that such is not the case. It is now claimed that the total mileage of the motor cars exceeds that of other vehicles and that this accounts for the heavy death toll and many injuries. It is to be noted, however, that much of the mileage is on country roads; that motor cars are used but little during the winter months and more particularly on Saturday afternoons, Sundays and holidays during the remainder of the year, while other vehicular traffic is nearly constant throughout the year. It is estimated that there are five times as many horse-drawn vehicles as automobiles. All things considered the committee is of the opinion that the automobile leads in accidents and fatalities.

Statistics of Accidents, Injuries, Death and Other Matters Pertaining to Vehicular Traffic in New York City.

Hospital Records.

Fourteen hospitals having ambulance service have submitted records for the months of March and April, 1912. The totals have been compiled and are given herewith.

Cases Cared for Resulting From—

(a) Automobile accidents..... 163
(b) Street-car accidents..... 129
(c) Horse-drawn vehicles..... 126

NATURE OF INJURIES.

Vehicle.	Fractured Skulls.	Broken Legs or Arms.	Serious Injuries, Internal or Otherwise.	Slight Injuries.	Very Serious Injuries from all Causes.	Total Slight Injuries from all Causes.	Deaths.	Permanently Injured.
Automobiles.....	19	32	21	91	72	91	10	4
Street cars.....	8	34	7	80	49	80	6	2
Horse-drawn vehicles...	4	41	7	74	52	74	3	2

Coroners' Records.

Deaths caused by automobiles for the months of January, February, March and April, 1912.

Manhattan..... 39
The Bronx..... 7
Brooklyn..... 5
Richmond..... 1
Queens..... 2
Total..... 54

Statistics of the National Highways Protective Society of accidents due to vehicular traffic in the City of New York for the first four months of 1912.

PEDESTRIANS, AS NEAR AS POSSIBLE TO ASCERTAIN.

	Killed.	Injured.
Automobiles.....	58	344
Trolleys.....	41	111
Wagons.....	34	49

COLLISIONS IN THE CITY OF NEW YORK FOR THE FIRST FOUR MONTHS IN THE YEAR 1912.

	Killed.	Injured.
Automobiles with automobiles		27
Automobiles with trolleys		47

Coroners' Records.

Comparison of the number of deaths caused by automobiles, street cars and horse-drawn vehicles for the year 1911 in various boroughs:

Borough.	Automobiles.	Street Cars.	Horse-drawn Vehicles.
Manhattan	90	72	139
Brooklyn	48	25	37
The Bronx	12	16	17
Richmond	3	1	2
Queens	6	8	3
Total	159	122	198

Statistics of the National Highways Protective Society of accidents due to vehicular traffic in the City of New York for the year 1911.

PEDESTRIANS, AS NEAR AS POSSIBLE TO ASCERTAIN.

	Killed.	Injured.
Automobiles	125	617
Trolleys	106	204
Wagons	161	102

COLLISIONS IN THE CITY OF NEW YORK FOR THE YEAR 1911.

	Killed.	Injured.
Automobiles with automobiles	1	82
Automobiles with trolleys		123

REPORT OF POLICE DEPARTMENT, NEW YORK, ON AUTOMOBILE ACCIDENT CASES FOR 1911.

There were 2,469 cases reported, in which 2,431 persons were injured, 40 killed, and 29 died later as result of injuries.

At or near corner	1,609
Weather conditions:	
Wet	133
Dry	667
Unknown	1,669
Chauffeurs licensed:	
Yes	2,033
No	55
Unknown	381
Arrests	166
Dispositions of arrests:	
Imprisonment	1
Fines	36
Sentence suspended	9
Discharged	106
Pending	14
Chauffeurs arrested before:	
Yes	12
No	196
Unknown	2,261
Persons injured under 16 years of age	851

Remarks—One killed, no arrest made, by order of Magistrate. (This case happened in the 147th Precinct.)

Report of Police Department, showing summary of deaths, injuries and arrests in connection with street traffic during 1911.

Total deaths from automobile accidents	69	
Total deaths from street-car accidents	63	
Total deaths from other traffic accidents	138	
		270
Total injured by automobile accidents	2,431	
Total injured by street-car accidents	3,614	
Total injured by other traffic accidents	4,532	
		10,577

Number of arrests for speeding and reckless driving.....	3,171
Convictions.....	2,999
Discharged and acquitted.....	167
Pending.....	5
	3,171

See Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

Appendix I.

Children Killed in Street Accidents, New York City.

(The *New York Times*, Sunday, February 2, 1913.)

"Of the 1,426 people killed on the streets in the past three years, 592 were children 16 years of age or under, or 41 per cent. of the entire number. According to the United States Census of 1910, the proportion of children 14 years old or less in New York City was 28.7 per cent. On that basis the proportion of children 16 years old or less would be about 30 per cent. This means that street traffic in this city is 30 per cent. more dangerous to children than to other members of the community—or, in other words, that the chance of an adult being killed by vehicular traffic is only about three fourths that of a child.

"At the other end of the scale of life the danger also increases. During the month of December, out of 46 fatalities in the entire city, 7, or about 16 per cent., of the victims were people 60 years old or over. By the same census report the proportion of such people to the entire population is about 4.86 per cent., showing that old people furnished nearly four times their ratio of victims. Tabulated these figures are:

	Children.	Old People.
Per cent. of population	30.0	4.86
Per cent. of fatalities.....	41.0	16.0

"This means that over half the victims of traffic in this city are drawn from the immature, the unprotected, the weak, and the ailing—in short, from just those classes of society which civilization boasts that it most protects."

Appendix J.

Traffic Accidents in Massachusetts.

In only a few of the state and city reports on vital statistics in this country are there any classified data relating to traffic or vehicular fatalities. The Massachusetts Registration Reports give some details, with distinction of sex.

DEATHS FROM TRAFFIC ACCIDENTS IN MASSACHUSETTS, BY KIND OF VEHICLE, AND BY SEX AND AGE OF PERSONS KILLED. 1909–1911.

BY AUTOMOBILES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	5	3.2	2	4.3	7	3.5
5–9	21	13.6	12	25.5	33	16.3
10–14	20	12.9	..	....	20	9.9
15–19	9	5.8	1	2.1	10	5.0
20–29	21	13.6	11	23.4	32	15.8
30–39	29	18.7	5	10.6	34	16.8
40–49	23	14.8	3	6.4	26	12.9
50–59	7	4.5	6	12.7	13	6.4
60–69	12	7.7	2	4.3	14	6.9
70–79	5	3.2	4	8.5	9	4.5
80 and over	2	1.3	1	2.1	3	1.5
Age N. S.	1	0.7	..	....	1	0.5
Total	155	100.0	47	100.0	202	100.0
Sex Distribution of Persons Killed		76.7		23.3		100.0

BY ELECTRIC RAILWAYS.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	10	5.8	7	19.4	17	8.1
5–9	11	6.3	8	22.2	19	9.0
10–14	11	6.3	2	5.5	13	6.2
15–19	7	4.0	..	....	7	3.3
20–29	27	15.5	5	13.9	32	15.2
30–39	32	18.4	6	16.7	38	18.1
40–49	30	17.2	2	5.5	32	15.2
50–59	16	9.2	3	8.3	19	9.0
60–69	20	11.5	1	2.8	21	10.0
70–79	4	2.3	1	2.8	5	2.4
80 and over	5	2.9	..	....	5	2.4
Age N. S.	1	0.6	1	2.8	2	1.0
Total	174	100.0	36	100.0	210	100.0
Sex Distribution of Persons Killed		82.9		17.1		100.0

BY STEAM RAILROADS.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	6	0.7	8	12.9	14	1.4
5–9	28	3.0	7	11.3	35	3.6
10–14	31	3.4	4	6.5	35	3.6
15–19	50	5.4	2	3.2	52	5.3
20–29	216	23.4	6	9.7	222	22.6
30–39	218	23.6	5	8.1	223	22.7
40–49	167	18.1	10	16.1	177	18.0
50–59	100	10.9	8	12.9	108	11.0
60–69	54	5.9	8	12.9	62	6.3
70–79	23	2.5	2	3.2	25	2.5
80 and over	8	0.9	2	3.2	10	1.0
Age N. S.	20	2.2	..	....	20	2.0
Total	921	100.0	62	100.0	983	100.0
Sex Distribution of Persons Killed		93.7		6.3		100.0

BY HORSES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	1	4.3	2	66.7	3	11.5
5–9	2	8.7	..	....	2	7.6
10–14	..	....	..	....	..	....
15–19	1	4.3	..	....	1	3.9
20–29	4	17.4	..	....	4	15.4
30–39	4	17.4	..	....	4	15.4
40–49	4	17.4	1	33.3	5	19.2
50–59	5	21.7	..	....	5	19.2
60–69	1	4.3	..	....	1	3.9
70–79	1	4.3	..	....	1	3.9
80 and over	..	....	..	....	..	....
Age N. S.	..	....	..	....	..	....
Total	23	100.0	3	100.0	26	100.0
Sex Distribution of Persons Killed		88.5		11.5		100.0

BY OTHER VEHICLES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	22	11.6	10	33.3	32	14.5
5–9	31	16.3	4	13.3	35	15.9
10–14	7	3.7	2	6.7	9	4.1
15–19	6	3.2	1	3.3	7	3.2
20–29	22	11.6	1	3.3	23	10.5
30–39	38	20.0	2	6.7	40	18.2
40–49	25	13.1	..	....	25	11.4
50–59	15	7.9	3	10.0	18	8.2
60–69	15	7.9	2	6.7	17	7.7
70–79	7	3.7	3	10.0	10	4.5
80 and over	..	....	2	6.7	2	0.9
Age N. S.	2	1.0	..	....	2	0.9
Total	190	100.0	30	100.0	220	100.0
Sex Distribution of Persons Killed		86.4		13.6		100.0

STREET RAILWAY FATALITIES, MASSACHUSETTS, 1908–1912.*

Year Ending June 30.	Passengers.	Employees.	Other Persons.	Total.
1908	28	13	80	121
1909	17	21	51	89
1910	9	12	59	80
1911	15	24	67	106
1912	27	21	74	122
Total	96	91	331	518

*Compiled from the annual reports of the Board of Railroad Commissioners.

STEAM RAILWAY FATALITIES, MASSACHUSETTS, 1908–1912.*

NUMBER KILLED.

Year Ending June 30.	Passengers.	Employees.	Travelers at Grade Crossings.	Trespassers.	Other Persons.	Total.
1908	11	92	27	146	15	291
1909	11	74	22	131	12	250
1910	9	89	29	164	12	303
1911	11	87	25	162	18	303
1912	15	91	24	132	17	279
Total	57	433	127	735	74	1,426

* Compiled from the annual reports of the Board of Railroad Commissioners.

Appendix K.

RULES AND REGULATIONS GOVERNING STREET TRAFFIC.

Nearly all of the larger cities of the United States have rules and regulations of one kind or another for the control of street traffic. A large proportion of these regulations have directly to do with the prevention of accidents, either to the vehicles, to the drivers or occupants of the same, or to the pedestrians on the streets and sidewalks. Certain of these rules are almost universal in application and among such may be mentioned the following: A vehicle meeting another shall pass to the right; a vehicle overtaking another shall pass to the left; a vehicle turning a corner is required to turn it in a particular way and so as not to interfere with traffic moving in an opposite direction; slow-moving vehicles are required to keep close to the right-hand side of the street, and fast-moving vehicles have the privilege of the more central portion of the street.

A "vehicle" is usually defined and the following extracts are typical:

Chicago. 1910.

The word "vehicle" includes equestrians, led horses and everything on wheels or runners, except street cars and baby carriages.

The word "horse" includes all domestic animals.

St. Paul. 1910.

That the term "vehicle," as used in this ordinance, shall include all vehicles propelled by human, animal or mechanical power, except fire apparatus, police patrols, hospital ambulances, United States mail wagons and vehicles which are run only upon rails or tracks.

These ordinances frequently make provision for a minimum age of drivers and this age in most cities is sixteen. In Syracuse, N. Y., however, no person is permitted to operate or drive a motor vehicle or other vehicle who is under eighteen years of age unless accompanied by a duly licensed chauffeur or the owner of the vehicle which is being operated. Some ordinances make it unlawful for any person to operate an automobile or motorcycle while in an intoxicated condition. In some ordinances, also, provision is made that the driver of any vehicle must have a sufficient view of the traffic following and at the sides of his vehicle, which must therefore be not so covered or constructed as to prevent such an outlook.

Most of the ordinances require that horses or other draft animals be securely fastened if left unattended in any street. Curiously enough, however, some cities make an exception to this rule. In Providence, R. I. for example, the ordinance reads, "No horse shall be left unattended for a longer period than ten minutes in any street unless he is securely fastened," etc. And in Boston, Mass., this provision reads, "No horse shall be left unattended for a longer period than five minutes," etc.

Several of the cities have found it necessary to make rules for the safety of drivers, passengers, and pedestrians, which on their face seem to infringe upon personal liberty. Experience, however, has taught these cities

that such rules have become absolutely necessary. To illustrate, the following rules are incorporated in the ordinances of several cities to prevent the carrying of passengers on the handle-bars of bicycles, a habit which has become quite common and which is exceptionally dangerous, not only to the riders but to pedestrians as well.

BALTIMORE. 1908.

Carrying children on Bicycles.—No bicyclist shall carry upon his bicycle any child under the age of 5 years.

Another practice which is common and yet exceedingly hazardous is that of stealing rides, hitching onto the rear of vehicles, etc. Many fatal accidents and a large number of very serious non-fatal injuries have resulted to children from this practice. Many of the cities now have quite stringent provisions prohibiting this and similar practices. Some typical instances are presented in the following excerpts from the ordinances of representative American cities:

BOSTON. 1908.

No one shall steal a ride upon any vehicle or street car, and no one shall ride upon the rear of any vehicle without the consent of the person in charge thereof.

CHICAGO. 1910.

No one shall ride upon the rear end of any vehicle without the consent of the driver, and when riding no part of his body shall protrude beyond the limits of the vehicle.

Another very dangerous practice in American cities is for children and adults to indulge in what is commonly called "coasting." This is a dangerous practice, particularly in congested sections of cities, and so many accidents have occurred that several of the cities now prohibit the practice. The following is a typical rule of this kind:

BALTIMORE. 1908.

Coasting Forbidden to Bicyclists.—No bicycle shall be allowed to proceed in any street of the city by inertia or momentum with the feet of the rider removed from the pedals.

Roller skating on streets is prohibited in a few cities of which the following is an example:

MEMPHIS. 1912.

No child or other person shall be allowed or permitted to use the streets of the city for the purpose of rolling thereon on roller skates; nor shall any child or other person be permitted or allowed to catch, hold on or attach himself or herself to any street car, automobile or other vehicle, whether such person is using roller skates or riding on a bicycle, with a view of being pulled along the streets.

It is a common practice also in American cities, and probably elsewhere also, for riders of bicycles to attempt trick riding in the city streets. This is specifically forbidden in Baltimore, the rule being as follows:

BALTIMORE. 1908.

Trick Riding Forbidden.—No rider of a bicycle shall remove both hands from the handle-bars, or practice any trick or fancy riding in any street.

Several of the cities incorporate in their street traffic ordinances, rules and regulations governing pedestrians as well as drivers. Some times these are in the form of warnings, and in other cases they are positive prohibitions. Typical instances of such regulations are the following:

CLEVELAND. 1912.

Pedestrians should never step from the sidewalk in crossing a street without looking in both directions to see what is approaching and shall cross at right angles with the street; and at street intersections they shall not cross diagonally, but shall go around the center of the line of traffic and cross only one street at a time.

DISTRICT OF COLUMBIA. 1912.

Pedestrians shall have the right of way over drivers of vehicles at street crossings only.

A pedestrian shall not walk in the roadway of a street except to cross at a street crossing, shall not stand in such roadway, and shall not cross the roadway diagonally.

A frequent source of serious personal injury is found in the interference of other vehicles with street cars while the latter are stopping to take on or discharge passengers. Several of the municipal ordinances, and particularly those adopted in recent years, make provision for the regulation of other vehicles in their relation to the street cars under the circumstances stated.

CHICAGO. 1910.

The driver of a vehicle overtaking a street car shall exercise the greatest care in passing not to interfere with or injure passengers who may board or alight from said cars.

NEW YORK CITY.

Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

In overtaking or meeting a street passenger car which has been stopped for the purpose of receiving or discharging a passenger or passengers, no such vehicle aforesaid shall pass or approach within eight (8) feet of said street car so long as the same is so stopped and remains standing for the purpose aforesaid.

The committee has also slightly changed the provision as to protection of passengers who are getting on and off street cars. For the past few months the City of Chicago has conducted experiments along these lines and has finally secured a provision which the Mayor of that city believes

to have been material in the preventing of accidents and the saving of life. The provision reported by the committee requires that a space of at least eight feet shall be preserved at all times between a street passenger car, which has been stopped to receive or discharge passengers, and any vehicle. If the space of eight feet cannot be preserved the vehicle must be brought to a full stop.

ST. PAUL. 1910.

That when any street railway car stops at any street crossing or regular stopping place in the City of St. Paul to receive or discharge passengers it shall be unlawful for the driver or person in control of any vehicle as herein defined, traveling along the same street as said street railway car, to pass such car without bringing said vehicle to a stop at least ten feet distant from the rear of said railway car.

SCRANTON. 1912.

"No vehicle shall pass a railway car that is taking on or discharging passengers at any crossing."

In some cities vehicles are required to stop in such a manner as not to interfere with the passage of pedestrians at the crossings. In other words, they are required to stop so that no part of the horse or vehicle projects over the crossing, and some times the rule reads that no part of the horse or vehicle shall project within a certain number of feet of the crossing. An instance of such a regulation is presented herewith:

PHILADELPHIA. 1913.

Vehicles must stop in such a way as not to interfere with the passage of pedestrians at the crossings, always stopping so as that no part of the horse or vehicle projects within five feet of the crossing.

Another frequent source of street traffic accident has been the running down of the pedestrian, or collision with another vehicle due to one vehicle following close after another. Some cities have found it necessary to regulate this practice and an instance is presented herewith:

PROVIDENCE. 1910.

"No person having charge of a vehicle shall allow the same to come within ten feet of any vehicle in front of him when approaching and passing over a crossing where a pedestrian is about to pass."

A few of the cities, in recent years, have adopted the practice of requiring street cars to stop on the near side of streets rather than on the far side. The theory, so far as it concerns accidents, is that when street cars stop on the near side of the street to take on or discharge passengers the momentum of the cars when crossing the street will be less and the danger of accident at the most dangerous points will thus be reduced. This method of handling street cars is at present in force in Cincinnati, according to the following regulation:

CINCINNATI. 1912.

Street cars and interurban cars shall stop on the near side of intersecting streets, and not at the far side, for the purpose of taking on or discharging passengers, and shall not obstruct any interesecting streets, or the path to be used by pedestrians in crossing streets.

I may add that this method was attempted in Newark, New Jersey, in 1913, but so many objections were raised that the practice was discontinued after a few months' trial, not because of accidents but because the passengers objected to boarding and alighting from cars at such distances from the cross side-walks. The pay-as-you-enter cars made it necessary for passengers to enter such cars at least a car length from the cross walk.

Some cities regulate the kind of warning signal to be used by vehicles; an instance of such regulations is as follows:

MEMPHIS. 1912.

In the operation of automobiles, motorcycles and other self-propelled vehicles upon the streets of the city of Memphis, the only kind of warning signal that will be permitted to be used shall be a reed horn, hand operated, with a rubber bulb, such as will emit a single note, in low tone, except in cases of electric vehicles, in which a bell not larger than five inches in diameter may be used.

Speed regulations are, of course, among the most important and most numerous, but a few typical instances of such regulations are presented herewith:

NEWARK. 1912.

No person or persons shall drive or ride any vehicle upon or along any street at a greater speed than at the rate of twelve miles an hour excepting, however, when turning a corner of any street the rate of speed shall not be greater than six miles an hour.

LOS ANGELES. 1912.

It shall be unlawful for any person to ride or drive, or to cause or permit to be ridden or driven, any animal or vehicle at a rate of speed greater than six miles per hour over or past or across any street intersection within the business district.

PASSING PUBLIC SCHOOLS.

Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

Upon approaching a bridge, or in passing a public school on school days between the hours of eight (8) o'clock antemeridian and four (4) o'clock post-meridian, the person operating, driving or propelling any vehicle subject to the provisions of section one (1) of this article, shall not proceed, nor shall the owner of any such vehicle riding thereon or therein cause or permit the same to proceed at a rate of speed greater than ten (10) miles per hour.

In this connection it is interesting to note that the state law sometimes

overrules local regulations, and an illustration of such an instance is the following:

MINNESOTA STATE AUTOMOBILE LAW. 1912.

Local regulations prohibited; no city, town, village or other municipality shall make or pass any ordinance, rule or regulation limiting or restricting the speed of motor-vehicles, and no ordinance, rule or regulation heretofore or hereafter made by any city, town, village or other municipality in respect to or limiting the use or speed of motor-vehicles shall have any force, effect or validity.

PENALTIES.

The main trouble in this country seems to be the failure properly to enforce the ordinances and to impose sufficiently severe penalties for the violation of the street traffic rules and regulations. There is considerable variety in the penalties imposed, and in many instances the traffic regulations, particularly as regards speed, are almost a dead letter. A few illustrative instances of penalty provisions are presented in the following excerpts from city ordinances:

KANSAS CITY, MO. 1911.

Any person who shall violate any provision of this ordinance shall, upon a first conviction thereof, be punished by a fine of not less than one nor more than two hundred dollars; upon a second conviction, shall be fined not less than ten dollars nor more than two hundred dollars; and upon a third conviction thereof shall be fined not less than twenty-five nor more than two hundred dollars.

MILWAUKEE. 1911.

"Any person violating any of the provisions of this ordinance shall, upon conviction thereof, be punished as follows: For the first offense, by a fine of not less than ten nor more than fifty dollars; for a second offense, by imprisonment in the house of correction of Milwaukee county for not less than ten nor more than thirty days; for any subsequent offense by imprisonment in the house of correction of Milwaukee county for not less than three nor more than six months."

NEW YORK.

Report of Special Committee on Speed Regulations of New York City The City Record, April 17, 1913.

The penalties provided apply to any violation of the provisions of the ordinance and are:

For the first offense not less than $25 nor more than $100, or by imprisonment not to exceed 15 days or by both.

The penalty for the second offense within one year is doubled and the penalty for the third offense within one year is a fine of $100, or imprisonment for a term not to exceed 60 days, or both.

THE INTERNATIONAL STATISTICAL INSTITUTE. XIVTH SESSION, VIENNA, SEPTEMBER, 1913.

By John Koren.

About 200 members and invited guests took part in the meeting which lasted five days. The following countries were officially represented, and for the greater part by their foremost statisticians: Australia, Austria, Belgium, Brazil, Canada, Denmark, France, Germany, Great Britain, Hungary, Italy, Japan, Mexico, Netherlands, Norway, Roumania, Russia, Servia, Sweden, and Switzerland.

The United States alone had the unenviable distinction of not being officially represented. Men from other countries find it difficult to comprehend why our government slights so important a scientific gathering and contrast its curious attitude with the enormous expenditures we incur for statistical work of all kinds. Of course the manifest lack of official interest is put down to our discredit and is taken to mean that the profession of statistics is not accorded the recognition which even the smallest European countries give it. That there is abundant justification for this humiliating inference is all too patent. Self-evidently, while this condition remains there cannot be that intimate association and co-operation in scientific work which is fundamental to governments the world over. There is another important aspect of the situation. We talk a great deal about cultivating proper international relations, but neglect one of the most obvious means of achieveing them—by official participation in international work of all kinds that touches the common welfare, whether it be strictly scientific or immediately practical.

This year an official recognition of the International Statistical Institute would have been particularly fitting as in conjunction with its meetings the Austrian Central Statistical Commission celebrated its fiftieth anniversary, an event which the government helped it to commemorate with becoming dignity not only through the publication of splendid memorial volumes and an elaborate exhibit of Austrian statistical work,

both official and private, of great interest, but by a hospitality as lavish as it was gracious. The Court, cabinet officers, the magistracy of Vienna, officials of high and low degree, and many private individuals helped to make the convention a memorable event.

The excellent work of organizing the affairs of the Institute was presided over and personally led by His Excellency, Dr. Meyer, formerly Austrian Minister of Finance and now president of the Central Statistical Commission, a change which spells anything but a descent in European eyes, but which could scarcely be imagined in the United States.

The Institute, which was opened by Archduke Ferdinand Salvator and presided over by the venerable Senator Bodio, did its main work in three sections: (1) on demography and method; (2) on statistics of economics; and (3) on social statistics. Under the strictly adhered-to rule of the Institute, reports and papers are submitted in advance in printed form. Unless an article is unusually brief, only a summary is communicated orally, thus affording opportunity for genuine discussion. Appended to this note is a list of the papers coming before the meeting.

Perhaps the most important function of the Institute is its effort to bring about international unity and co-operation in statistical work. To this end many special committees have been appointed from time to time and instructed to study different subjects and bring in recommendations. For a long while it has been discussed how far the most effective instrument for this purpose would be a permanent statistical bureau under the direction of the Institute. At last such a bureau is to be created. Its scope and organization are set forth in the following program submitted to the majority of a special committee charged with a study of the subject:

The Permanent Bureau of the International Statistical Institute has for its object:

1st. To collect, examine, and preserve in its library the statistical documents of different countries and International Offices. It will derive from them the data which can be used for international comparisons, especially everything relating to demography.

2d. To facilitate by its permanent activity the unification of methods, of questionnaires, processes of documentary examination, and manner of publication, in such a way that the results may be most effectively compared.

3d. To publish as soon as possible an International Annual, a periodical bulletin, and, if need be, other works in which, along with statistical tables, there will appear a bibliography, as well as reports relating to the progress and innovations effected in certain countries, and which it would be profitable to make known in detail to all countries.

The use of languages shall be in accordance with the articles of the constitution and the regular practice of the International Statistical Institute.

The permanent headquarters of the Bureau is at the office of the International Statistical Institute.

The Permanent Bureau is placed under the authority of the Institute represented by its Bureau. It is under the management of the General Secretary.

With the approval of the President, the General Secretary may appoint to aid him one or several head clerks and the staff necessary for the work of the Permanent Bureau.

The expense of the Permanent Bureau will be covered:

1st. By a subvention from the International Statistical Institute, the amount of which will be determined by the General Assembly.

2d. By subventions from the various countries. The government of the country in which the headquarters of the Institute are located, will take the steps necessary to obtain these subventions.

3d. By gifts and bequests.

4th. By the income from the sale of publications, etc.

The financial administration of the Permanent Bureau is completely separated from the financial administration of the International Statistical Institute. None of the sums at the disposal of the Permanent Bureau can be spent for any other object than that determined by Art. 1.

The annual reports on the administration of the Permanent Bureau and the annual financial statement will be presented at each session of the Institute by the General Secretary.

In the event of the liquidation of the Permanent Bureau the Board of Overseers, mentioned below, will decide upon the use to be made of the assets and will appoint liquidators.

A Board of Overseers, composed as follows, will control the financial administration of the Permanent Bureau. This Board shall be made up of:

One representative from each country furnishing a subvention of at least 5,000 francs. Every country whose annual subvention exceeds 10,000 francs will be entitled to two representatives.

Furthermore, every group of persons or every individual donor who contributes to the expenses of the Permanent Bureau may be allowed by the Institute to be represented on the Board.

The Board will arrange its own organization and will determine the order of procedure.

Among other committee reports submitted at the Vienna meeting may be mentioned one under the title "La statistique du chômage" of 185 pages, the joint work of a committee of the Institute and the International Association on Unemployment. The document, which was presented by Dr. George von Mayr and M. Louis Varlez, contains reports from different countries and formulates the following principles:

I. No adequate conception of the problem of unemployment can be obtained by means of one kind of statistics alone. At present three statistical sources which supplement each other seem to be necessary for the acquisition of a satisfactory knowledge of the subject. These are:

1. The general census of unemployment which should be facilitated and interpreted by means of local supplementary or independent inquiries;

2. The trade union statistics of unemployment;

3. Inquiries into the condition of persons employed in industrial undertakings instituted by employers or by the authorities.

II. The general compulsory census, or still better, occupational or industrial census, is the essential starting point for any attempt to obtain accurate and complete statistics of unemployment in industry and commerce.

III. Instead of asking whether the person concerned is unemployed, the question on the census paper should be "Did you work on (date)? For whom did you work?"

IV. Persons answering the first question in the negative might be required to give information on the following points on a supplementary form: Cause of unemployment (list of possible causes to be given on the form); exact date when the unemployment commenced; whether the person in question has any subsidiary occupations; whether he has registered himself at a labour exchange and if so at which exchange; whether he is receiving unemployment benefit from a trade union, a friendly society or from any other source (source from which benefit is obtained to be clearly stated); length of his residence in the locality.

V. The forms relating to the unemployed should be worked up with the forms filled in by the other workers and should contain all the general information usually required (age, sex, status, industry or profession, origin, residence, etc.)

VI. Before finally deciding upon the form of questions to be put to the unemployed, it would be advisable to hold *experimental* inquiries in different towns, which should be held as far as possible under exactly similar conditions as the General Census of unemployment. These experimental inquiries should be tested and arranged by an international commission of experts.

VI bis. Inquiries of this kind held at industrial centres either regularly or during crises would also be valuable.

VII. It is desirable that the general census should be supplemented by means of local and regional inquiries.

VII bis. Specially valuable information can be obtained from the Unemployment Insurance Office wherever such a system is in force.

VIII. The fluctuations of unemployment and the percentage of persons entirely without employment can best be ascertained from the trade union unemployment statistics which are collected by most Governments.

IX. It does not at present seem desirable to use the statistics of the number of days in respect of which unemployment benefit has been payable instead of those of the percentage

of unemployed members of trade unions. The former are, however, highly valuable and should be published.

X. Identical forms of questions should be adopted in all countries where inquiries of this kind are to be held and should be sufficiently detailed to allow of the grouping of the unemployed according to occupation and locality.

XI. For the purposes of international statistics it is recommended that instead of merely publishing the comparative figures as at present, the figures for the different industries should be compared separately and the result in the different classes of district kept separately.

XII. It is recommended that periodic inquiries should be held respecting persons employed in industrial establishments. This is the only way in which reliable data can be obtained as to occupations in which short time and casual jobs are customary.

XIII. All other sources of statistical information respecting unemployment and even respecting phenomena connected with it must be examined in the future as they have been in the past. The method of collecting this information should be improved in such a way as to yield the most fruitful results for purposes of international comparison. The labour Exchange statistics which give information as to the lack of work of unemployed persons up to the date of registration and those relating to the compulsory sickness and invalidity insurance might in the future be of great value in this connection. The statistics of migration within each country and of emigration and immigration might also be used with advantage to supplement the unemployment statistics."

A very important report was that on international financial statistics, prepared by Dr. Freiderich Zahn, director of the Royal Bavarian Statistical Office, of which special mention will be made in a subsequent number of this publication.

To Dr. Thirring, Director of the Statistical Bureau of Budapest, is owing that the project of an annual statistical yearbook of the large citied of Europe seems about to be realized. The subject has long been under discussion in statistical circles. Finally, in 1907, the burgomaster of Budapest, being strongly convinced of the need of such a publication, induced

Dr. Thirring to take the initiative and bring the subject before the Institute. At the meetings in Copenhagen and Paris the matter was discussed, and at the Vienna session he presented part one of the proposed annual, printed as manuscript. It deals: (1) with meteorological conditions; (2) the condition of population (total polulation, age, population according to religious confession); (3) movement of population, (marriage and divorce, births, mortality, including causes of death and infant mortality, immigration and emigration). In all 15 European countries with a total of 145 cities, most of them of 100,000 population and over, are represented. It is suggested that the Institute encourage the plan and support it by active co-operation. Participation by the United States were highly desirable but it is unthinkable until we arrive at the dignity of having efficient statistical bureaus not only in each state but in each large city. Moreover, on the side of vital statistics, we are not in position to contribute the material needed.

Another report of special importance and prepared by a committee of the Institute, bearing the title "Statistique des exploitations industrielles des états et des municipalités," was presented by M. G. Schelle of Paris. A preliminary report had been submitted by him at the meeting at The Hague and he now follows it by one of 139 pages containing a variety of comparative statistics of great value. It is proposed that the committee continue its labors.

Of other committee reports which it is hoped may be considered in some detail in a later number of this quarterly should be mentione done on "Statistique des états de culture," presented by M. Lucien March; and one on "La répartition des revenus et fortunes privés," presented by A. N. Kiaer, director of the Central Statistical Bureau of Norway.

Among the papers of an unofficial character deserving special attention was one by Dr. Friederich Zahn on "Die Frau in Erwerbsleben der Hauptkulturstaaten," a contribution to statistics of women in industry, with five statistical tables.

Of incisive critical nature was the article on the statistics of the causes of criminality by Dr. Hoegel, general prosecutor, who denies the possibility, at least for the present, of stating causes of criminality in statistical form.

Another paper dealing with crime matters was submitted by M. Koefod, chief of the Danish statistical bureau, and is entitled "Statistique des recidives de delinquants Danois."

The only paper by an American was a brief one by Prof. Irving Fisher under the title "What an International Conference on the High Cost of Living Could Do." Unfortunately, the author was not present to urge his plan for such a conference. He mentions as the "unsolved problems" which should be considered, the following:

(1) What have been the facts during the last two decades or more as to the cost of living?

(2) What have been the causes?

(3) What have been the evils?

(4) What is the outlook for the future?

(5) What are the remedies?

Prof. Fisher, hinting at the possibility of the high cost of living being a monentary problem, discusses the remedy he has proposed in a standardized monetary unit, which is well known to American readers.

Two elaborate mathematical-statistical papers were placed before the Institute; one "Ueber die Zeitfolge Zufälliger Ereignisse," by Prof. Dr. L. von Bortkiewicz (Berlin); the other bearing the title "Zu den Anwendungen der Wahrscheinlickkeitsrechnung in der Mathematischen Statistik."

Among the new committees appointed was one to consider the statistics of the production and consumption of alcohol, the instigation of it coming from the International Committee for the Scientific Study of the Alcohol Question.

The next meeting of the Institute—two years hence—is to be held at Brussels.

List of Reports and Papers submitted to the International Statistical Institute, 1913;

A. De Wendrich, Statistique internationale des transports.

L. Varlez, Statistique international du chômage.

A. N. Kiaer, Répartition des Revenues privés.

H. Hoegel, Ursachen der Straffälligkeit.

B. Jovanovitch, Über die landwirtschaftlichen Nutztiere im Königreiche Serbien, ihr Wert und ihre Verteilung an die einzelnen Besitzer.

L. Von Bortkiewicz, Über die Zeitfolge zufälliger Ereignisse.

L. MARCH, Statistique des Etats de culture.

F. ZAHN, Die Frau im Erwerbsleben in den Hauptkulturstaaten.

M. BELLOM, Statistique internationale de l'assurance contre l'invalidité.

G. SCHELLE, Statistique des exploitations industrielles d'Etat et des Municipalités.

F. ZAHN, Statistiques des finances.

H. FORCHER, Zu den Anwendungen der Wahrscheinlichkeitsrechnungen in der mathematischen Statistik.

P. MEURIOT, Des migrations intérieures à Paris et à Londres à l'époque contemporaine.

P. MEURIOT, De la valeur du terme de banlieue dans certaines métropoles Londres, Paris, Berlin.

P. MEURIOT, De l'état actuel de la Statistique religieuse dans les Etats européens.

L. MARCH, Commission de l'office international de Statistique, résumé des discussions au cours de la réunion qui s'est ouverte à Rome le 26 Avril 1913 sous la présidence de M. L. March, membre de la Commission.

P. E. FAHLBECK, L'évaluation de la richesse nationale de la Suède.

M. HUBER, Table de durée des mariages en France.

E. NICOLAI, Fécondité des mariages.

R. DUDFIELD, Registrement des naissances et décès.

A. ANZIFEROFF, Quelques considérations sur la Statistique du mouvement coopératif.

A. TSCHUPROW, Zur Frage des sinkenden Knabenüberschusses unter den Geborenen in Frankreich.

M. KOEFOD, Statistique des récidives de delinquants Danois.

W. SCHIFF, Erhebungen von Wirtschaftsrechnungen minderbemittelter Familien.

L. MARCH, Statistique internationale du mouvement de la population.

I. FISHER, What an international conference on the high cost of living could do.

U. GIUSTI, Sur la mesure de la Densité des Agglomérations en urbaines en général et en Particulier des Agglomérations italiennes.

A. JULIN, Statistique des Accidents du Travail en Belgique.

G. THIRRING, Bericht über die Herausgabe des Statistischen Jahrbuches der Grosstädte.

H. GODFREY, L'Organisation Statistique au Canada.

Y. GUYOT, Les facteurs des prévisions économiques.

R. VAN DER BORGHT, Die Frage der Herbeiführung internationaler Vergleichbarkeit in der Wohnungsstatistik.

G. MORTARA, Numeri indici delle condizioni economiche d'Italia.

S. C. LOCH, Statistics of Public Poor Relief in some Capital Towns.

FELLNER, Die Schätzung des Volksvermögens Österreichs und Ungarns.

SORER, Indexzahlen zur wirtschaftlichen Entwicklung Österreichs.

RAFFALOVICH, Statistique des primes et subventions.

FUSTER, Statistiques concernant les Accidents du Travail.

FOLDES, Statistiques des prix des grains.

NEYMARCK, Statisque internationale des valeurs mobilières.

SCHMID, Statistischer Hochschulenunterricht in den verschiedenen Kulturstaaten.

HJELT, Kurze Darstellung der Organisation der offiziellen Statistik in Finnland und der gegenwärtig hier in Ausführung begriffenen oder geplanten statistischen Arbeiten.

THOMPSON, Irish Statistics.

JULIN, Recensement de l'Industrie et du Commerce au Belgique au 31 Décembre 1910.

SILBERGLEIT, Internationale Wohnungsstatistik.

RICCI, Statistique internationale des superficies et des productions agricoles.

SIMIAND, Le mouvement général des prix à la fin du 15e au 18e siécle.

AN INDEX OF CHANGES IN EXTRACTIVE INDUSTRIES.

By William E. Leonard, *School of Economics, University of Texas.*

The following pages deal primarily with changes in production during the past thirty years of our industrial history—that is, from 1880 to 1909. For the purposes of this paper it is assumed, in the first place, that the gross output of our farms, forests, and mines, as expressed in bushels, tons, etc., may be taken as a fairly correct index of our capacity to produce utilities. In the aggregate volume of these products is found the basis for manufacture and commerce. And in saying this there is no disposition to relegate these industries to any less important position in our industrial life, but simply to regard them as later, or secondary stages, in the process of production.

Moreover, it is believed that production expressed in the terms of quantities gives a more nearly correct view than if expressed in value. This is due, of course, to the familiar fact that our standard of value itself is constantly undergoing change. This is especially true in the past thirty years, during which there has been an undoubted expansion and shrinkage in value of the dollar. For this reason any comparison based on values would prove false. Then, too, quantity is directly connected with the standard of life in a way that value cannot be: high values may mean a low standard of living, but large quantities in production must ultimately mean the satisfaction of more wants.

But more important, in the long run, than mere volume of production, are the tendencies which, from period to period, assert themselves. For instance, what sources of production tend to shrivel and dry up? What sources tend, not merely to maintain themselves, but to steadily increase? What new sources of production come into existence? All such changes are fundamental in the economic life of a people.

Important as the long-time movements are, they form, nevertheless, but one factor in the problem—the supply factor. The second factor is population and this represents the demand factor. It is futile to study the one apart from the other. They are necessarily interrelated and mutually dependent upon each other. Does population increase more rapidly than production? Sooner or later prices must rise, capital funds are reduced, and the standard of life goes down. On the other hand, does production outrun population in rapidity of increase? In this case a surplus will soon appear, one part of which will go, under normal conditions, to increase the funds out of which capital is drawn, and the remaining part to increase the standard of well-being.

It is impossible, of course, to bring into array all production. However, as early as 1880, we have a fairly correct record of the annual output of the great staples of soil and mine. All together some twenty-five of these staples are taken account of in this paper. These are so important that they represent by far the greater part of the whole field of production. It is doubtful if the production of other materials would exert any modifying influence upon general movements. Farm products will include corn, wheat, cotton, potatoes, sugar, tobacco, and a half-dozen less important commodities. All farm animals are included, all forest products, and all the chief minerals, except gold and silver.

The output of each product, for each year, is reduced to a simple index with 1890 as 100. This year is made the base year for all products as well as for population. This gives a perfectly uniform basis for comparison. This year, 1890, is chosen because it is, perhaps, the most normal year of the whole period. An unweighted average is used for two reasons: it is perfectly simple and requires no explanation, and in the second place this average is conservative, rather tending to minimize tendencies and to give comparative results entirely within the truth.

The one third of a century covered by this study is one of unusual interest because of the variety and nature of its economic movements. The earlier years go back to a time when competition was the law of trade; to the days when

small scale industry was the rule, and when private initiative was practically unrestrained by public interference. The latter years have brought big business and monopoly as the dominant form of industry, while legislative scrutiny and legal interference represent a new public attitude towards industry. These changes record the passage to a new economic order: That they have affected the productive powers of the nation may be accepted without question.

General Index for Population and Production.

First, in order, is a comparison between the index for population and that of production as a whole (Chart 1). The

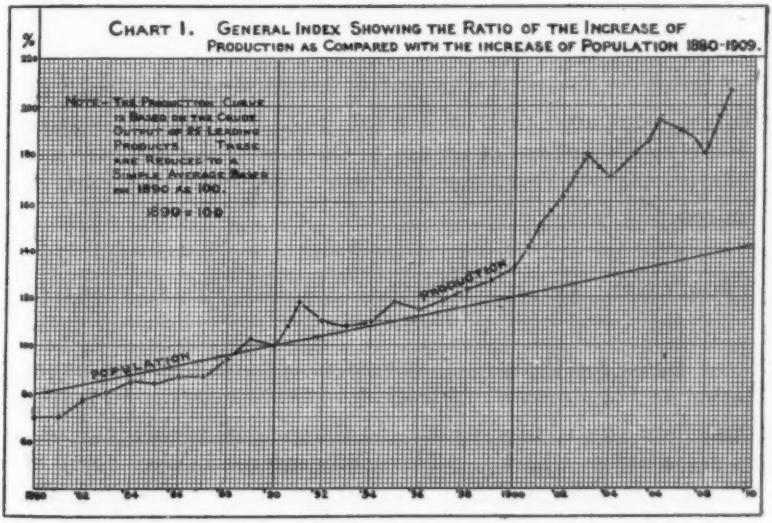


CHART I. GENERAL INDEX SHOWING THE RATIO OF THE INCREASE OF PRODUCTION AS COMPARED WITH THE INCREASE OF POPULATION 1880-1909.
%
1890 = 100
POPULATION
PRODUCTION

curve for population, of course, shows so uniform a rate of increase that for practical purposes there results a nearly straight line. As for the combined sources of production, a quite different story is told.

1. Taking the date 1896, for instance, and comparing the years before with those after it, there appear many ups-and-downs in the first, but very few in the later period.

2. During the whole 30 years production has increased more rapidly than population except for a few periods of short duration. The drops extend over from one to two years.

The rises extend over longer periods, ranging from two to seven years. Under these circumstances the standard of living is affected adversely only for brief intervals, the tendency being steadily upward.

3. The rapid upward tendency is especially marked since 1896. Roughly, but approximately, this increase is shown as follows:

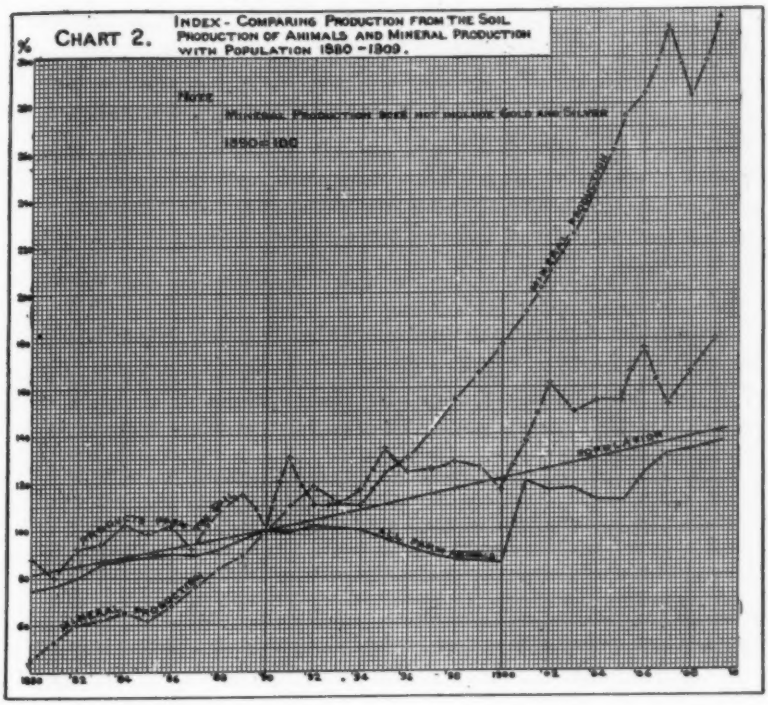
	1880 to 1896 (16 years) 1890=100.	1896 to 1909 (14 years) 1890=100.
Index for increase of population	32.3	29.2
Index for increase of production	39.3	104.1

During this period the index for production stands at 104, as compared with 39, for the first. By assuming a relatively high standard of living for the first period we can certainly conclude that, for the later years, we are fortunate indeed.

Production in the Several Fields of Extractive Industry.

So much for the general movement of the two factors, population and production. A second question, whether all industries have contributed equally to the very favorable increase, is answered in Chart 2. The composite production curve of Chart 1 is separated into its factors, clearly revealing the part each industry has played in the whole field of production. Extremes of great importance appear. On the one hand, farm animal production has increased scarcely as fast as population, while mineral production has moved forward at a phenomenal rate. In these movements several points are to be noted.

1. The characteristic saw-tooth movement of agricultural production throughout the whole period. This is due, of



course, to seasonal and price fluctuations coupled with the fact that agriculture, being a competitive industry, there is little or no regulation of the output. Hence one extreme follows another in yearly cycles. The last ten years show a decided tendency to increase, but with great yearly fluctuations.

2. The curve for farm animal production is wholly different from any other line of production. Roughly, there are three ten-year periods, moving in cycular form. The first ten years show a slow, but steady, increase; the second ten years, a steady decline; the last ten years, showing great irregularities: first, phenomenal rise, a decline, and a final rise at the close. For the whole period farm animal production corresponds very closely, except for its irregularities, to the line representing population.

3. The curve for mineral production is most interesting. There are several points to be noted:

(a) Except for the transitional period in the middle nineties the movement is very regular and quite uniformally upward. Only three downward movements are shown: 1885, which is insignificant; 1893 and 1894, and finally 1908.

(b) The sharpness of the upward swing after 1894 is shown in the fact that from 1880 to 1894 their production increased 64.1 per cent., while, from 1894 to 1909 they increased 208 per cent.

From the above facts showing the very slow increase of animal production, a much greater increase of products from the soil, and a phenomenal increase of minerals it must be concluded that our increased productivity springs very largely from minerals.

Changing Character of Agricultural Production.

Thus far the general movements of the several fields of production have been followed. A more detailed analysis of each field is now attempted. In doing this it will be interesting to compare the first years of the period with the last. However, to guard against errors due to exceptional years, (as the first and last might be) an average has been taken of the years 1880, 1881, and 1882 for comparison with an average of the last three—1907, 1908, 1909. It is believed this method will avoid any error due to exceptional years, either good or bad.

Applying this method to agricultural products, we find, that each figures very differently as to output. Roughly there may be distinguished three groups. In the first group will be found wheat, wool, and swine and, at the present time, cattle; in the second, cotton and horses.

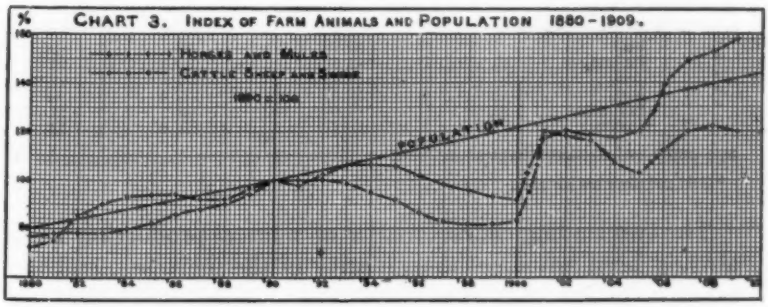
Groups of Products.		3-year average (1880, '81, '82) 1890=100.	3-year average (1907, '08, '09) 1890=100.	Increase.
	Index for Population.	80.	141.5.	61.5.
I. Farm products which have not increased as rapidly as population.	Index for Production:			
	Wheat,	114.9	169.6	54.7
	Rye,	97.5	123.5	26.0
	Buckwheat,	94.0	127.3	33.3
	Wool,	89.9	113.2	23.2
	Swine,	73.9	106.6	32.7
II. Farm products whose increase is relatively the same as the increase of population.	Horses,	77.7	141.3	63.6
	Cotton,	72.8	134.6	61.8
	Tobacco,	80.6	141.6	61.0
III. Farm products showing a relatively large increase.	*Cattle,	64.5	135.6	71.1
	Corn,	101.2	179.8	78.6
	Oats,	84.0	163.5	79.5
	Mules,	74.7	167.7	93.0
	Potatoes,	119.6	214.3	94.7
	Barley,	66.9	243.0	176.1
	Sugar,	70.3	239.0	168.7
	Rice,	76.6	439.3	362.7

*Recent years have seen a remarkable decline in the production of cattle, as is shown by the following figures:

1909,	71,1 millions,	with index at	134.
1910,	69,0 "	"	130.
1911,	60,5 "	"	114.
1912,	57,9 "	"	109.

The 3-year average for 1880, '81, and '82 of 64.5, when compared with the index at 100 for 1912 shows an increase of only about 45 per cent. thus putting cattle in the first group, instead of the third, group as shown above.

A further analysis of farm animals is made by throwing them into two classes, those desired for draft purposes, and those wanted for food and clothing. The movement of the two groups is shown in Chart 3. In general the curves paral-



lel each other. Comparing the indexes at the two periods we find:

	3-year average (1880, '81, '82,) 1890=100.	3-year average (1907, '08, '09) 1890=100.	Increase.
Index for horses, and mules,	76.3	154.6	78.3
Index for cattle, sheep, swine,	78.6	121.6	43.0

Here, it appears, that all food animals increase less rapidly than population. In noting the general movement of farm animals, attention was called to the remarkable drop in production from 1890 to 1900. We are now to observe that the food animals contributed most largely to this long-drawn out slump. It is to be explained by saying that it was a period of low prices, resulting in low production. Only with rising prices was increased production secured, and even at the present high prices, the increase barely equals the increase of population.

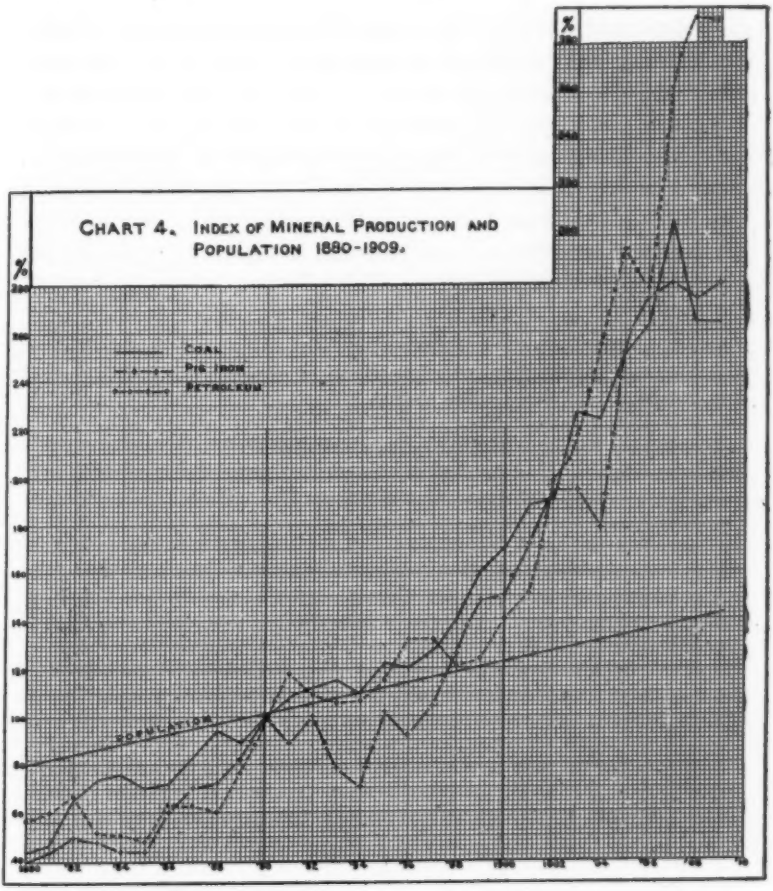
PHENOMENAL INCREASE IN PRODUCTION OF MINERALS.

The radical tendency shown in mineral production, however, is strikingly apparent. (Chart 4). Based upon a comparison between the first and last part of the period the following results are gained.

	3-year average (1880, '81, '82) 1890=100.	3-year average (1907, '08, '09) 1890=100.	Increase.
Index for all Mineral Products,*	53.3	306.3	253.0
" " Lead,	80.7	239.1	158.4
" " Pig Iron,	45.3	244.3	199.0
" " Coal,	51.5	277.0	227.5
" " Zinc,	50.2	337.0	286.8
" " Petroleum,	61.0	388.1	320.1
" " Copper,	28.7	352.0	323.3

* Gold and silver not included.

The two leading characteristics of mineral production have already been noted,—the regularity of the increases, and the rapidity of the increases since 1894. As in agriculture, so also in mining, we find widely differing ratios of increase,



ranging from 158, in the case of lead, to 323 for copper, and 320 for petroleum. Iron and coal hold a midway position between these extremes, increasing in about the same ratios, with fluctuations occurring at closely corresponding periods. In minerals there appear to be fewer fluctuations up and down than in other fields of industry, but when they come they are greater in extent. Of all the minerals, coal is subject to the fewest fluctuations, due to the fact that coal has more than one primary use, and thus demand is more constant.

Compared with agriculture and forestry the output of minerals shows a remarkable development, from which at least two conclusions may reasonably be drawn. The first, already suggested, is that the increase in the production of crude utilities springs pretty largely from mineral sources alone. This is confirmed not only by the facts just given, but by common knowledge as well. In the second place, the rapidity of the increase points clearly in the direction of exploitation of mines and oil fields.

Now in respect to these industries, we are, it is feared, repeating the history connected with agriculture and forestry. Until 1890, we ignorantly supposed that both were inexhaustible, and so we proceeded to use these resources in a most prodigal manner. The sole purpose appeared to be to create vast numbers of farms and to produce from them great quantities of farm products regardless of cost or even prices. In short, we were interested in the creation of farms, not in maintaining them on any strictly business basis. This was none else than the speculative use of lands, which of course, led to the exhaustion of soils. As in the seventies and eighties we were laying waste our forests and mining our agricultural lands, taking no account of exhaustion and depreciation, so now we are mining our mineral resources.

But the consequences of this prodigality will not be the same as in agriculture, or in forestry. In agriculture the soil may be reduced in fertility, but it never becomes entirely exhausted, and there is always the possibility of full restoration. In fact, the pressure of population must eventually reduce agriculture to a cost basis, which of necessity, will include the maintenance of the soil in continuous, or even in creasing fertility. The same principle, working through longer periods, applies also to forestry, for the demand for lumber will create a price which must cover its cost of production. In short these industries are not exhaustive of the sources out of which their wealth springs.

In the mining industries, however, it is not possible to reduce the business to a cost basis, since the principle of the sinking fund can be applied to the capital invested, that is to the machinery and plant. For the replacement of the contents

of the mine no replacement fund can be established. Hence, the production of minerals is a purely extractive industry and ultimately exhaustive of the sources out of which its wealth comes.

It is precisely for this reason that the individualistic view point, which in agriculture is not altogether at variance with general welfare, becomes in mining, a question of grave concern. The individual producer of minerals is primarily interested in his capital, and against this he establishes a replacement fund, which becomes a fixed change upon the industry. Of less interest to him is the slowly shrinking general supply, obtained at increasing costs, which costs are passed on to the consumer. In the remoter fact of exhaustion he is still less concerned. But what to the individual are secondary considerations become matters of primary importance to society, and hence the necessity for a broader view point. Looked at from the social point of view minerals are not merely fixed in quantity; they are becoming increasingly important in the economic life of a people. The import of these unquestioned facts we realize, but seldom ponder.

The social point of view, then, regards mineral deposits as fundamentally essential to the future as well as to our present economic life and urges that their use should be so distributed as to yield, in the long run, the largest aggregate of utilities. This does not mean any penurious hoarding of our mineral treasures for the use of some far-distant time, but it does meana discriminating frugality in their use, and to this end two policies are advocated by those holding the broader view point. (1) That all unnecessary wastes be eliminated. These are admitted as being enormous in every mining enterprise, and are known to be very largely preventable. To save these wastes is socially desirable even if not expedient to the individual producer. (2) That natural products, which are limited in supply, be more and more restricted to their primary and fundamental uses for which no substitute exists. It is admitted that great difficulty may be found in determining what are primary and what are secondary uses. And yet, it is believed, these may be roughly determined in most instances. To illustrate: Should there be a question as to the use of

petroleum as a dust cover (a secondary use), if, as a base for the manufacture of lubricants (a primary use) there is no equally good substitute? Numerous illustrations of like character, are found in all industries dealing with valuable natural agents.

Those who acquiesce in the prodigal use of the natural agent do so on the basis of two assumptions: The discovery of substitutes, and the application of scientific methods. Both these principles are of undoubted importance. But to place reliance upon a substitute which has not yet appeared and proved its value is the height of social folly. It will be admitted, too, that there are problems which scientific methods cannot solve on any economic basis. Both substitutes and improved processes delay, but do not overthrow that most fundamental of all economic laws, the law of increasing costs.

Finally, the enormous increase in output of utilities over population has given us a new standard of living. To the extent that this rests upon increases from the soil, it is secure and permanent: to the extent that it is based on increased mineral production, and manufacture, it is secure or insecure to the degree that the natural resources are frugally used and carefully husbanded.

REVIEWS AND NOTES.

Vital Statistics of England and Wales for 1911.

The 74th annual report of the Registrar-General of marriages, births and deaths in England and Wales gives the salient features of the vital statistics of 1911 as follows:—

The marriage rate was 15.2 per 1,000, being 0.3 below the average in the ten years 1901 to 1910. It was, however, 0.2 per 1,000 above the rate in 1910, which in turn had shown an increase of 0.3 over the rate in 1909, while the provisional figures as yet available for 1912 show a further increase of 0.3 per 1,000. The birth rate in 1911 was 24.4 per 1,000, and was 2.8 below the average for the preceding decennium. It was the lowest rate on record, being no less than 0.7 below that of 1910, the next lowest, while the provisional figures for 1912 indicate a further fall of 0.6 per 1,000. The death rate in the year was 14.6 per 1,000, and though it was 0.8 below the average of the ten preceding years, it was 1.1 per 1,000 above that in 1910, which was the lowest on record. The provisional rate for 1912, however, is only 13.3 or 0.2 less than the low record of 1910. It is pointed out in explanation that of the total increase of 1.1 in the rate of 1911, no less than 0.8 is accounted for by excess of diarrhœal mortality, and when allowance is made for that and for other effects of the extraordinary climatic conditions of 1911, it will appear that the recent improvement was well maintained in that year. Infantile mortality, however, was 130 per 1,000 births, being 25 per 1,000 more than in 1910 and the highest recorded since 1906. Excluding again diarrhœal mortality, the rate in 1911 was only 2 in excess of that of 1910, which was the lowest until then recorded; and the provisional rate for 1912 being only 95, there appears, says the report, to be no reason to doubt the reality of the fall that has taken place during the present century.

The tables as to ages at marriage show that the proportion of minors married per 1,000 marriages at all ages continues on the decrease, and that the mean age at marriage in the case of all husbands was 29.03, and of all wives 26.80. The number of persons divorced in 1911 was 1,160, a slight decrease on the figure for 1910, and 702 divorced persons were re-married—365 men and 337 women.

In the present report are contained for the first time the changes which were foreshadowed in the report for 1908. The first is the substitution of the administrative for the registration area as the local unit of tabulation for births and deaths, a change which, it is held, will render the reports of much greater service both to those engaged in public health administration and to scientific inquirers. Two other new features designed to remedy the want of co-ordination between the statistics of the Registrar-General's Office and those of other departments, are the use of

the international list of causes of death and the allocation of all deaths, as far as possible, to the area of residence.

English papers have received these "remarkable statistics" with some misgivings. The fewer marriages and births in the upper and middle classes of the populaton are attributed to the growing love of luxury and ease and to the high cost of living. "But it is a notable fact," says an official of the Church army who works among the poor, "that in the lowest grades of society the fructivity of the people is unchecked."

J. K.

The Director of the Census recently appointed Hon. S. N. D. North and Hon. William R. Merriam, former Directors of the Census; Professor Walter F. Willcox, of Cornell University; Mr. W. S. Rossiter, formerly Chief Clerk of the Census; and Hon. Daniel C. Roper, First Assistant Postmaster General, and formerly an official of the Census Bureau, as special agents of the Bureau to make studies of the present condition of statistical work, including particularly the unfinished work of the Thirteenth Census, and plans for the better organization and administration of the Bureau in connection with the annual and other inquiries. These gentlemen have been on duty at the Bureau during the past week or ten days, and have been making inquiry and studies concerning the various problems assigned to them.

It was evident at once that the condition of work in the Census Bureau required a separation of the problem into two parts, the first and most pressing being the disposition of the remaining work of the Thirteenth Census. A series of recommendations embodied the opinions of the experts, individually and collectively, and are as follows:

September 19, 1913.

"*To the Director:*

"In view of the facts (1) that the act for the taking of the Thirteenth and subsequent censuses requires that the reports of that census shall be completed and published on or before July 1, 1912; (2) that, although three and one-half years have now elapsed since the enumeration, much of the Thirteenth Census work is still uncompleted; (3) that the regular annual reports and other work of the intercensal period have been greatly delayed because a large body of census clerks is still employed upon the Thirteenth Census work; (4) that the value and usefulness of the annual and other reports required by law are largely dependent upon the promptness with which they are compiled and given to the public; and (5) that current appropriations are required for the purposes for which they were made.

"The undersigned special agents of the Bureau of the Census, instructed by the Director to make studies of particular branches of statistical work in the Bureau, have now partly completed their several tasks, and advise the Director to begin no new tabulations or analyses in connection with the unfinished branches of the Thirteenth Census; namely,

Population and Mines and Quarries, and to readjust the work on those branches and on the delayed annual reports so as to insure their publication not later than December 31, 1913.

"Therefore we advise:

"1. That the proposed second machine run of the cards for the purpose of tabulating occupations be abandoned, thus expediting the time of production by about six months and reducing the cost of finishing that branch by about $65,000; and that the tables yielded by the first run of the cards be printed without derivative tables or text. These tables give the number of persons of each sex in each occupation, and classify them by race, nativity, and parent nativity, and five age periods, thus insuring the publication of the primary classification of occupational data as reported at previous censuses.

"2. That the report upon native tongue be limited to the chapter to appear in the forthcoming final volume on population.

"3. That the tables relating to Mines and Quarries now in the form of printed bulletins, proofs, or manuscript be sent to the Public Printer at once, the same to constitute the final report on Mines and Quarries, and that no further tabulations or text be prepared in connection with that report.

"4. That tables for the benevolent institutions, and for the institutional population, namely, prisoners, insane and feeble-minded, and paupers, be prepared and published without percentage or other derivative tables and without analytical text.

"5. That the annual compilation of the statistics of forest products be abandoned. There appears to be no authority of law for an annual inquiry of this character, which the records show to have cost from $20,000 to $40,000 a year.

"6. That the annual report on the financial statistics of cities for 1912 be completed and published by January 1, 1914, by curtailing the amount of detail to be included; that the schedules and report for 1913 be similarly curtailed; that the reports for the years 1912 and 1913 be printed without text, except such as is necessary for explanation and definition; and that until the annual reports on the financial statistics of cities are brought up to date, no attempt be made to prepare a report on general municipal statistics. This recommendation is based on the fact that delay in the compilation and publication of the annual municipal reports detracts seriously from their value.

"7. That the reports on mortality statistics for the years 1911 and 1912 be published before the close of the present calendar year. To make this possible, the text of these reports should be reduced to a minimum or omitted, the tables condensed, and no effort made to publish a report on births until the mortality reports are published.

"8. That work upon the standardization of death rates, life tables, and occupational mortality be suspended until the above reports have been published. There is no reason why the mortality report for each year

should not be compiled and published prior to the close of the succeeding calendar year.

"9. That the emergency presented by the delay in completing the Thirteenth Census justifies the Director in requesting the Secretary of Commerce to lay the matter before the President with the view of securing his instructions to the Public Printer to give precedence so far as practicable to the remaining publications of the Thirteenth Census and the annual reports long overdue.

"The undersigned special agents of the Bureau of the Census submit these recommendations. They will severally give their attention to the various questions submitted to each of them by the Director, and prepare further memoranda for his consideration at an early date."

It is probable that the inquiries of the experts into the more important but less pressing subject of the organization and administration of the Bureau in connection with the current work, and the statistical reports to be taken up during the remainder of the present decade, will be the subject of another series of recommendations to be made within the next thirty days.

Director Harris expresses the earnest hope and expectation that the studies and recommendations of the former officials and others interested in the Bureau will result in great improvement in the quality of work, in the rapidity of its production, and also effect a reduction of expenditure.

WALTER F. WILLCOX.

FIRST GENERAL CENSUS OF THE UNION OF SOUTH AFRICA.

Fifty years had passed since the enactment of the first Cape Colony Census Act, when in May, 1908, the Inter-Colonial Conference (the precursor of the National Convention, which led to Union) met at Pretoria, and discussed *inter alia* proposals for uniformity of statistical methods. The first Union Parliament passed a Census and Statistics act and a Permanent Census Bureau was established in 1912. A quinquennial census of the European population is required by the new Constitution for electoral purposes, and the Census Bureau has a busy future before it.

At the date of the 1911 census the area in square miles of the Union of South Africa was computed as follows: Cape of Good Hope, 275,995; Transvaal, 110,426; Orange Free State, 50,389; Natal, 35,290; Total, 473,100.

The population figures are as follows: Cape of Good Hope, European or white, 301,268 male and 281,109 female; Bantu, 721,441 and 798,498; mixed and other colored, 239,962 and 229,687. Transvaal, white, 236,913 and 183,649; Bantu, 705,862 and 513,983; colored, 28,780 and 17,025; Orange Free State, white, 94,488 and 80,701; Bantu, 168,585 and 157, 239; colored, 14,445 and 12, 716. Natal, 52,495 and 45, 619; Bantu, 427,061 and and 526,337; colored, 85,092 and 57,439.

Total

European,	685,104 male and	591,078 female
Bantu,	2,022,949 male and	1,996,057 female
Colored,	361,279 male and	316,867 female
Grand Total	3,069,392	2,904,002

Quoting from the 1891 Census Report it may be said: "The European or white population consists of the descendants of the original Dutch Colonists and French Refugees, and of the immigrants chiefly of British and other Teutonic races, who more recently arrived in the colony. *The Mixed* class includes the great and increasing population which has sprung from the intercourse of the colonists with the indigenous races."

The total number of male Europeans enumerated, 658,164 and of female 591,078 (details having been secured in all but 89 male and 31 female instances), show the following age distribution: 0–4 years, 94,232 and 91,340; 5–9 years, 78,571 and 76,859; 10–14 years, 62,890 and 61,567; 15–19 years, 63,982 and 61,708; 20 years and upwards 385,400 and 299,573.

A birdseye view of the main results by certain age periods of the European Educational Census of the Union is afforded by the accompanying statement, which at the same time, by way of contrast, gives the corresponding figures for a group of three Australian States, with jointly a similarly sized population, but where the compulsory system had been in force since 1871 in Western and 1875 in Southern Australia and Queensland, and where there have been no warlike disturbances.

At age period 5–9 years, the Union white population was about 11,200 in excess for each of the two sexes, of the corresponding figures for the Australian group selected, but the educational percentages differed in a greater measure, thus: for Union 53.1 per cent. male and 51.2 per cent. female could neither read nor write against 16.4 per cent. male and 15.9 per cent. female in Australia, consequently, 40.2 per cent. male and 48.2 per cent. female could read and write and read only in the Union, compared with 79.2 per cent. male and 79.5 per cent. female in the land over the sea. The two populations agree closely at the next age point, and the cannot read and write percentages are 0.7 and 0.5 for Australia, and 5.6 and 4.2 for the Union. At the stage 15–19 years, the Union population is 1977 less for males and 1336 for females than that of the sister country, and the percentages run as follows: Neither read nor write Union 2.1 and 1.5 compared with Australia 1.0 and 0.4.

The conjugal condition of the European population of the Union is shown by the following figures: Of the total number of females (591,078) 36.12 per cent. were married at the Census date, with 4.52 per cent. widowed and 0.11 per cent. divorced. These figures can be compared with 34.96 per cent., 5.32 per cent. and 0.04 per cent. respectively in the Australian group. For females 15 years of age and older the percentages are as follows: married 59.0, widowed and divorced 7.6. Turning to the other side of the question, it is found that of the males of 15 years and upwards 50.14 per cent. were married and 2.8 per cent. were widowed and divorced.

Without proceeding into detail with the corresponding Australian figures, the following derivations have been ascertained: males, 15 years and over, married—44.3 per cent.; widowed and divorced, 3.8 per cent.; females, 15 years and over, married—53.10 per cent.; widowed and divorced, 8.15 per cent.

The Director of the 1891 Census had some difficulty in determining which areas could be legitimately included as urban, and ultimately each case was considered and determined on its merits. On the last occasion, however, the administration took matters as they stood. Since 1891 some 47 small areas at that time rural, have become urban by the creation chiefly of village Boards or full Municipalities. In the tables now discussed, the population is classed as Urban or Rural as stated in the Census publications of the time, but it should be borne in mind that the increase of the former element is more apparent than real. While in the aggregate the population was fairly evenly distributed at the date of the last Census, the proportion twenty years earlier stood at 42.16 per cent. urban and 57.84 per cent. rural.

In settled communities the female section of the population tends to outnumber the male, notwithstanding the fact that the male births exceed the female in nearly all European countries. Mr. Knibbs, the Commonwealth Statistician, moreover reports that the number of males per 100 females registered as born in the Commonwealth has varied as follows: 1901 proportion 104.11; 1904, 105.13; 1907, 104.89; 1910, 106.39.

The proportion of the races for the whole of the Cape Province was in 1911 as follows: European or white, 22.71 per cent.; Bantu, 59.26; mixed and colored, 18.03. The colored population is fairly well concentrated in the coast and central zones.

A. C. Dale.